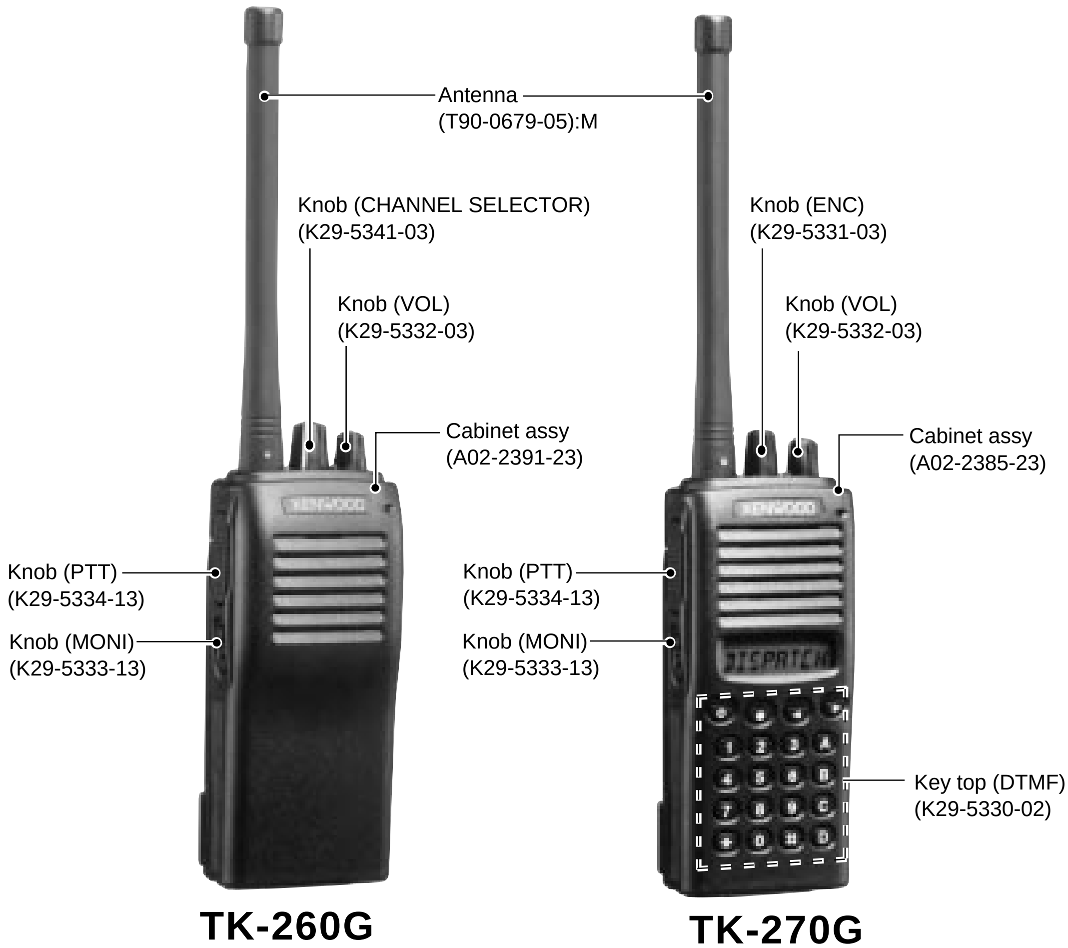
VHF FM TRANSCEIVER

TK-260G/270G

SERVICE MANUAL

KENWOOD

B51-8493-00(S) 1425



M market models are shown.

CONTENTS

GENERAL / SYSTEM SET-UP

INTRODUCTION

SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. These are issued as required.

ORDERING REPLACEMENT PARTS

When ordering replacement parts or equipment information, the full part identification number should be included. This applies to all parts, components, kits, or chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

PERSONNEL SAFETY

The following precautions are recommended for personnel safety:

- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- This equipment should be serviced by a qualified technician only.

SERVICE

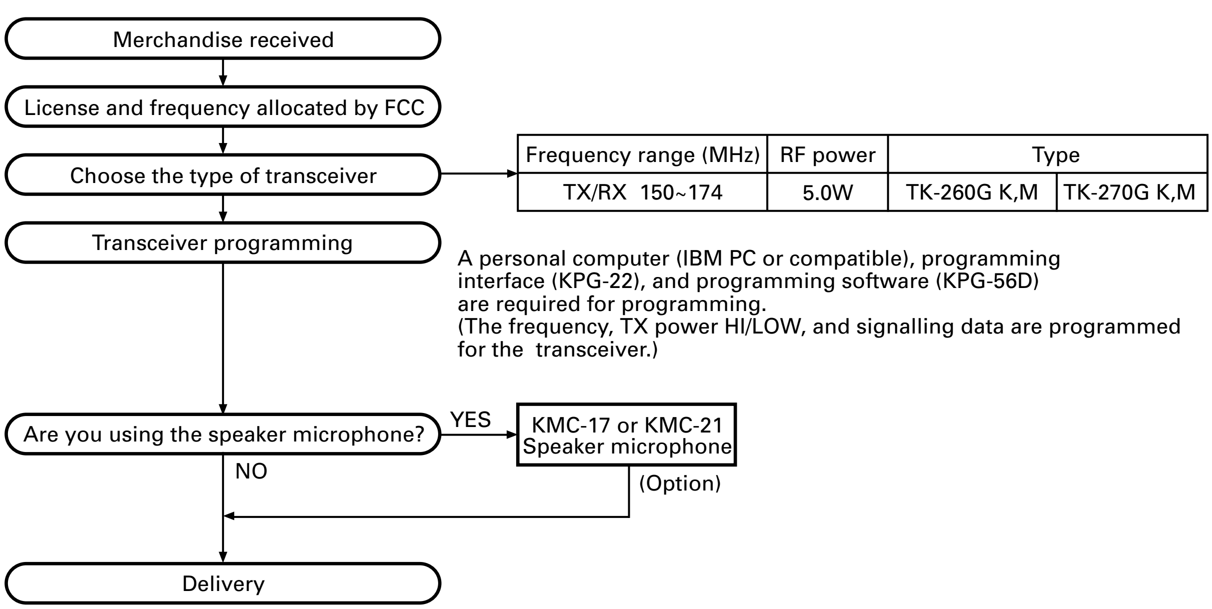
This radio is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

NOTE

WE CANNOT guarantee oscillator stability when using channel element manufactured by other than KENWOOD or its authorized agents.

Model & destination \ Unit		X57-587X-XX 0-10	X57-587X-XX 0-11	X57-587X-XX 0-21	X54-325X-XX 0-10	Frequency range	Remarks	Helical Antenna	Charger	Battery	16 Key
TK-260G	K	○			–	150~174MHz	IF1 : 49.95MHz LOC : 50.4MHz	OP	OP	OP	–
	M	○			–			○			–
TK-270G	K		○		○			OP			○
	M			○	○			○			○

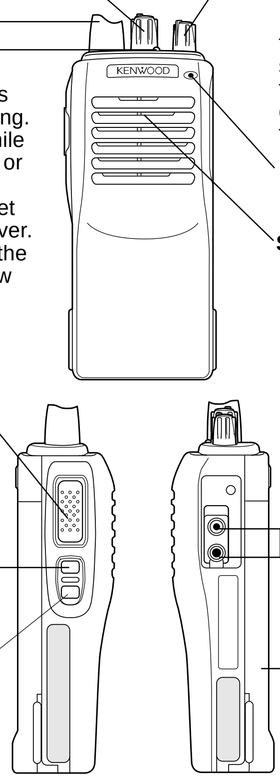
SYSTEM SET-UP



OPERATING FEATURES

1. Operation Features

• TK-260G

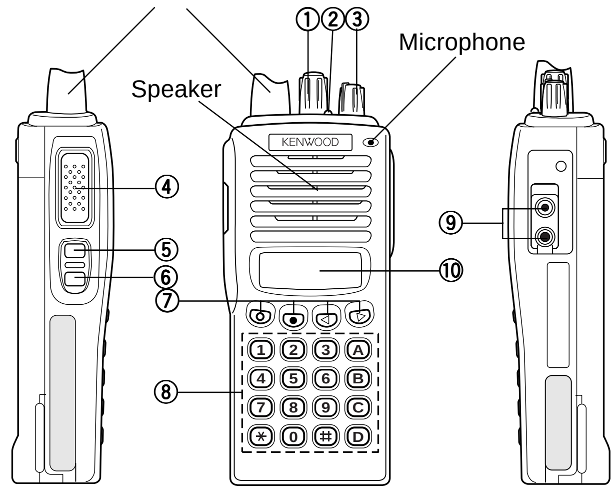


Programmable Auxiliary Functions

Side 1 key and **Side 2** key can each be programmed with one of the following auxiliary functions:

- **Monitor A (Monitor Unmute–Momentary):** Press and hold the **Monitor** key to hear background noise. Release the key to return to normal operation.
- **Monitor B (Monitor Unmute–Toggle):** Momentarily press the **Monitor** key to hear background noise. Press the key again to return to normal operation.
- **Monitor C (Carrier Squelch–Momentary):** Press and hold the **Monitor** key to deactivate QT, DQT, 2-Tone, or DTMF signalling. Release the key to return to normal operation.
- **Monitor D (Carrier Squelch–Toggle):** Momentarily press the **Monitor** key to deactivate QT, DQT, 2-Tone, or DTMF signalling. Press the key again to return to normal operation.
- **None:** No function.
- **RF Power Lo:** Press the **RF Power Lo** key to toggle the output power of a channel between high and low. This can only be used for channels that have been programmed with high power. Pressing **RF Power Lo** while using a channel programmed with low power causes an error tone to sound. (When changing a channel from high to low power, all channels programmed with high power are changed to low.)
- **2-Tone Encode Select:** To transmit using a 2-Tone code, press the **PTT** switch and the **2-Tone Encode Select** key, then speak into the microphone in your normal voice.
  Release the **PTT** switch and **2-Tone Encode Select** key to receive.

• TK-270G



The transceiver is shown with the optional KNB-14 battery pack.

① **Rotary encoder**
Your dealer can program the encoder as either Group Up/Down or Channel Up/Down (default setting). Rotate to select a group or channel. Also rotate to adjust the squelch in Squelch Adjustment mode.

② **LED indicator**
Lights red while transmitting. Lights green while receiving. Flashes orange while receiving a Code Squelch code or a Selective Call code, or a 2-Tone or DTMF signal that matches the one set up in your transceiver. Flashes red when the battery power is low while transmitting.

③ **Power switch/ Volume control**
Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. To switch OFF the transceiver, turn counterclockwise fully.

④ **PTT (Push-to-Talk) switch**
Press this switch, then speak into the microphone to call a station.

⑤ **Side 1 key**
This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 4).

⑥ **Side 2 key**
This is a PF (Programmable Function) key. Press it to activate its auxiliary function (page 4).

OPERATING FEATURES

⑦ **○, ●, ◄,► keys**
These are PF (Programmable Function) keys. Press each key to activate its auxiliary function.

⑧ **DTMF keypad**
Used for storing and transmitting DTMF numbers.

⑨ **SP/MIC jacks**
Connect an optional speaker/ microphone here.

⑩ **Display**
(See page 5.)

Note: *The PF keys are programmed with default functions:*

- ***Side 1 key:*** *Lamp*
- ***Side 2 key:*** *Monitor A*
- ***○ key:*** *Scan*
- ***● key:*** *Scan Del/Add*
- ***◄ key:*** *Talk Around*
- ***► key:*** *RF Power Lo*

Programmable Auxiliary Functions

Side 1, Side 2, ○, ●, ◄, and ► can be programmed with the auxiliary functions listed below.

- Channel Down
- Channel Up
- Display Character
- Group Down
- Group Up
- Home Channel
- Key Lock
- Lamp
- Monitor A (Monitor Unmute–Momentary)
- Monitor B (Monitor Unmute–Toggle)
- Monitor C (Carrier Squelch–Momentary)
- Monitor D (Carrier Squelch–Toggle)
- None
- Operator Sel Tone [1]
- Redial
- RF Power Lo
- Scan
- Scan Del/Add
- Scrambler
- Selectable QT [2]
- Talk-Around
- 2-Tone Encode Select

[1] *Available for K and M market models only.*

[2] *Available for M market models only.*

2. Programmable keys

The functions the FPU programs to the function keys are described in the following sections.

1) Channel up/down (TK-270G only)
When the key is pressed each time, the channel number to be selected is incremented/decremented and repeats if held for one second or longer.
This key functions as the voice scrambler code selector in the voice scrambler code select mode.

2) Display character (TK-270G only)
This key switches the LCD display between the group/ channel number and group/channel name.

3) Group up/down (TK-270G only)
When the key is pressed each time, the group number to be selected is incremented/decremented and repeats if held for one second or longer.

4) Home Channel (TK-270G only)
Press this key once, the channel switches to the pre-programmed home channel.

5) Key lock (TK-270G only)
When the KEY LOCK switch is held down for one second or more, keys other than [PTT], [LAMP], [MONI], [VOL], [POWER], and KEY LOCK are locked.
When 12/16 KEY LOCK is set with the FPU, the DTMF key is locked and when front-panel KEY LOCK is set, the DTMF key and the [PF] key are locked.

6) Lamp (TK-270G only)
This key illuminates the LCD and keys on the front panel. When the key is pressed, the LED lamp goes on.
When it is released, the lamp goes off after about five seconds. If any key is pressed while the LED lamp is on, the lamp is kept on for five seconds.

7) Monitor
Used to release signalling or squelch when operating in conventional mode. It is also used to reset option signalling.

8) Operator Selectable Tone (TK-270G K types only)
This key switches the pre-set decode QT/DQT and encode QT/DQT to OST (Operator Selectable Tone) tone pair.
Press this key, the transceiver enters OST mode. In this mode, the display shows "OFF" and the operator can select one of the OST tone pair using the tuning control. The display shows "TONE ∗∗" and tone pair No. ∗∗ is selected.
Press OST key again, the transceiver exits from OST mode, and returns to the group/channel mode.
16 tone pairs for OST can be programmed by KPG-56D.
OST is useful to access the repeater with same radio frequency and different tone (QT/DQT).

OPERATING FEATURES

9) Reverse (REV) (Note: C type only)

When the REV switch is pressed, transmission can be performed with the receive frequency and receive signaling, and reception can be performed with the transmit frequency and transmit signaling.
When REV is on, HORN ALERT and PUBLIC ADDRESS do not work.

10) Selectable QT (SEL QT) (TK-270G M types only)

When the SEL QT switch is pressed, QT frequency can be temporarily changed with the CH switch.

11) 2-Tone Encode Select (TK-270G only)

① Press the key programmed as 2-tone Encode Select.
• A pre-programmed 2-tone code name appears on the display.
② Press the key programmed as Channel Up and Channel Down to select you desired 2-tone code name.
③ Press PTT switch and 2-Tone Encode Select key to transmit and release them to receive.

Note:

The code for the TK-260G is not selectable.
You cannot change the tone in step ② by using the Channel Up and Channel Down keys.

12) Redial (TK-270G only)

Pressing this key when Group/Channel is shown, displays the previously transmitted DTMF code. Pressing [PTT] at this time, transmits the code that is currently displayed.

13) RF power low

Used to temporarily switch transmission output to low power.
Turning the function on enables:
Hi→Low, Low→Low
Key states are backed up, except in the PC mode when they are reset.

14) Scan (TK-270G only)

Pressing this key starts scanning. Pressing this key again stops scanning.

15) Scan Del/Add (TK-270G only)

This key switches the currently displayed channel between "Delete" and "Add".
The "Add" channel is contained in the scan sequence, the "Delete" channel is not contained. In the scan mode, this key switches the channel between delete or add, temporarily.

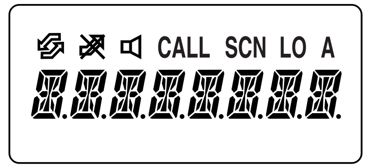
16) Talk Around (TK-270G only)

Press this key, the transceiver uses the receive frequency and tone for transmission.
The operator can call the other party directly (without repeater). Press this key again, the talk around function goes off.

17) None

An error operation beep sounds, and no action will occur.
Use this function when the transceiver is required to be operated more simply.

3. Display (TK-270G only)



Icon	Description
	Not used in this transceiver.
	Appears when the selected channel is busy.
	Appears when QT, DQT, DTFM, or 2-Tone decoding is deactivated (by pressing the **Monitor** key).
CALL	Appears when you receive a Code Squelch, Selective Call, 2-Tone, or DTMF Signallling call. Also appears when you transmit using Code Squelch or Selective Call.
SCN	Appears while scanning.
LO	Appears when using low power on the selected channel.
A	Appears when the selected channel is included in the scanning sequence.
	Displays the selected channel, the squelch level, DTMF digits (when entering digits, confirming digits, or making a call), and messages received via Selective Call.

4. Scan Operating (TK-270G only)

1) Scan types

- **Single Group Scan**

You can scan all valid (ADD) channels in the displayed group that can be selected with the group selector.

- **Multiple Group Scan**

You can scan all valid (ADD) channels in all valid (ADD) groups.

2) Scan Start Condition

One or more non-priority channels must be added to all channels that can be scanned. The transceiver must be in normal receive mode (PTT off).

When you activate the key programmed to the scan function, scan starts. The scan icon ("SCN") lights and "SCAN" is indicated on display.

OPERATING FEATURES

3) Scan Stop Condition

The scan stops temporarily if the following conditions are satisfied.

① The receiving signal matches the signalling code in your radio that is set by the programming software (KPG-56D).
② When the Monitor key is depressed.

4) Scan Channel Types

① Priority channel is the most important channel for scan, and always detects a signal during scan and when the scan stops temporarily.
② Non-priority channels detect a signal during scan. For the channels that can be selected with the group or channel selector when the scan does not occur, the "A" icon lights.

5) Priority Channel Setting

A priority channel can be set as follows with the programming software (KPG-56D).

① Specify a priority channel as a fixed priority channel.
② Make a selected channel a priority channel.
Specify the initial channel before the operator changes it.

6) Scan Type According to the Priority Channel

① When no priority channel is set : Only the non-priority channels are scanned.
If a non-priority channel stops temporarily, it stops until there is no signal on the channel.
② When priority channel is set : Either priority channel is scanned.
If a non-priority channel stops temporarily, a priority channel signal is detected at certain intervals.
If a priority channel stops temporarily, it stops until there is no signal on the priority channel.

7) Revert Channel

The revert channel is used to transmit during scanning and set by the programming software (KPG-56D).

① Priority
The transceiver reverts to the priority channel.
② Priority with talkback
The transceiver reverts to the priority channel.
If you press PTT during a resume timer (dropout delay time, TX dwell time) or calling, you can transmit on the current channel to answer to the call however revert channel is set to priority channel.
After resume time, scan re-starts and the transmission channel returns to the priority channel.
③ Selected channel
The transceiver reverts to the channel before scanning or the channel that you changed during scan.
④ Last called channel
The transceiver reverts to the last called channel during scan.
⑤ Last used channel
The transceiver reverts to the last used (transmitted) channel during scan. "Last used" revert channel includes talkback function.
⑥ Selected with talkback
The transceiver reverts to the channel before scanning or the channel that you changed during scan.

8) Scan End

When you reactivate the key programmed to the scan function during scan mode, scan ends.

The scan icon ("SCN") and "SCAN" or revert channel (programmable) display goes off.

9) Temporarily Delete/Add

It is possible to delete or add a channel temporarily during scan. When scan stops on an unnecessary channel, for example by interference of the other party, press the delete/add key, then that channel is deleted temporarily and scan will re-start immediately.

When you would like to add a deleted channel temporarily to the scan sequence, select the desired (deleted) channel during scan, and press the delete/add key before scan re-starts.

That channel is added temporarily to the scan sequence. The temporarily deleted or added channels are returned to their pre-set delete/add conditions when the transceiver exits from scan mode.

5. Details of Features

1) Time-out timer

The time-out timer can be programmed in 15 seconds increments from 15 seconds to 300. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled and a warning tone sounds while the PTT button is held down. The alert tone stops when the PTT button is released.

2) Selective Call Alert LED

You can select whether or not the LED on the transceiver flashes orange when selective call has occurred.

3) PTT ID

PTT ID provides a DTMF ANI to be sent with the PTT button every time it is used (Begin of TX ID at beginning of transmission, End of TX ID at end of transmission, or both).

You can program the PTT ID as one of the followings.

Off, BOT (Begin of TX ID), EOT (End of PTT ID), BOTH.

The contents of ID are programmed for each channel.

The transceiver is capable of having ID. The format is DTMF.

The timing that the transceiver sends the ID is programmable.

Begin of TX ID (BOT) : Begin of TX ID is sent at the beginning of transmission.

End of TX ID (EOT) : End of TX ID is sent at the end of transmission.

Both : Begin of TX ID is sent at the beginning of transmission and End of TX ID is sent at the end of transmission.

There is also a "PTT ID" setting for each channel.

OPERATING FEATURES

4) Battery Warning

This transceiver has a battery warning feature. If low voltage is detected during transmission, the transceiver warns you by a flashing red "LED".

When the voltage is detected to be even lower during transmission, the transceiver stops transmission and warns you by a flashing red "LED" and a beep.

Please notice "indication" for the battery exchange, charging time by flashing red LED and beep.

5) "TOT" Pre-Alert

The transceiver has a "TOT" pre-alert timer. This parameter selects the time at which the transceiver generates a "TOT" pre-alert tone before the "TOT" is expired.

"TOT" will expire when the selected time passes from the TOT pre-alert tone.

6) "TOT" Re-Key Time

The transceiver has a "TOT" re-key timer. This timer is the time you cannot transmit after the "TOT" is exceeded. After the "TOT" re-key time expires you can transmit again.

7) "TOT" Reset Time

The transceiver has a "TOT" reset timer. This timer is the minimum wait time allowed during a transmission that will reset the "TOT" count.

"TOT" reset time causes the "TOT" to continue even after the PTT is released, unless the "TOT" reset timer has expired.

8) OST (Operator Selectable Tone) (TK-270G K types only)

The transceiver is capable of having the "OST" function and 16 tone pairs (QT/DQT) with a max 10-digit name for each tone pair.

9) Clear to Transpond

The transceiver waits for an acknowledment signal until the channel free.

This feature ensures the acknowledment signal is receive by another party.

10) Battery Save

This is the automatic battery saver during standby mode operation. The receiver circuit is turned on and off to conserve the battery life.

6. Option Signalling (DTMF/2 tone)

Built-in DTMF decoder is available for option signalling.
Built-in 2-Tone decoder is available for option signalling.

It is possible to use individual call, group call, DBD (Dead Beat Disable). **Note :** DBD is only DTMF

Preset operation is triggered when there is a match with Option Signaling.

When Option Signaling matches on a Group Channel where it is set to Yes, the Option Signaling display flashes and Option Signaling is canceled. Settings after this will cause "Transpond" or "Alert" to sound.

Setting the Selective Call Alert LED will cause the LED to start flashing orange.

Mute or Unmute is triggered by the ID/QT/DQT/Carrier when option signaling matches (when Option Signal is deactivated by a transmission).

AND/OR

Option Signaling match conditions can be selected with AND/OR logic.

	Alert/Transpond	AF Mute Open
AND	Triggers at match with QT/ DQT/ID+DTMF(2tone);Opt	Triggers at match with QT/ DQT/ID+DTMF(2tone);Opt
OR	Triggers at match with QT /DQT/ID+DTMF(2tone) ; Opt	Triggers only for match with QT/DQT/ID;Signaling

Even if set as OR, there is no Alert/Transpond just with DTMF.

Even if set as OR, AF mute cannot be canceled just by a match with DTMF.

In conventional channels not set with QT/DQT, signaling is a match just by receiving the carrier.

Auto Reset

When Option Signaling matches on a Group channel where it is set to Yes, Option Signaling is canceled when it matches a group channel set to Yes.

After Option Signaling matches, Option Signaling can automatically Reset after a specified time.

Dead Beat Disable

When the D.B.D (Dead Beat Disable) code matches, a preset operation is performed.

When D.B.D matches on all group channels regardless of whether Option Signaling = Yes/No, then TX Inhibit or TX RX Inhibit is activated by the settings performed afterwards. D.B.D is canceled when the D.B.D. code + "#" is received.

Transpond is always activated when the D.B.D code matches. Alert is not output. An Option Signaling match is not displayed.

OPERATING FEATURES / REALIGNMENT

7. Audible user feedback tones

The transceiver outputs various combinations of tones to notify the user of the transceiver operating state. The main tones are listed below

The high tone is 1477Hz, the mid tone is 941Hz, and the low tone is 770Hz.

- **Power on tone**

This tone is output when the transceiver is turned on. (The high tone is output for 500ms.)

- **Alert tone**

This tone is output when the transceiver is in TX inhibition for TOT, battery warning and PLL unlocked. It is output until the PTT button is released. (The 697Hz tone is output.)

- **Busy Tone**

This informs the user of a busy channel lock out

- **Group Call Tone**

The group call tone informs the user of a group call in DTMF/ 2 Tone Option Signaling. This tone repeats 7 times.

770Hz		770Hz
30ms	30ms	30ms

- **Individual Tone**

Individual tone is issued on receiving selective call by DTMF/ 2 Tone Option Signaling.

2000Hz		2000Hz		2000Hz
100ms	100ms	100ms	100ms	100ms

- **Pre Alert tone**

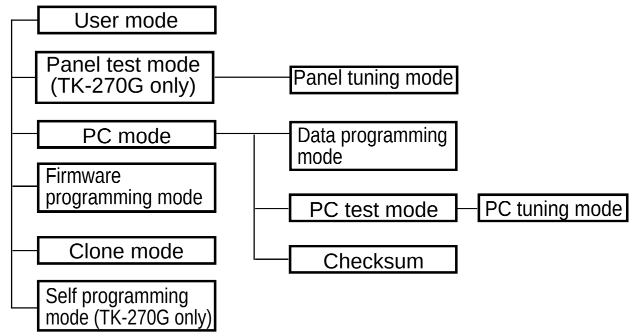
Informs the user when nearing transmit inhibit (transmit cutoff) time due to TOT.

The Pre Alert Tone is issued from the time set for TOT Pre Alert until the TOT triggers.

1633Hz		1633Hz		1633Hz
50ms	50ms	50ms	50ms	50ms

REALIGNMENT

1. Modes



Mode	Function
User mode	For normal use.
Panel test mode	Used by the dealer to check the fundamental characteristics.
Panel tuning mode	Used by the dealer to tune the radio.
PC mode	Used for communication between the radio and PC (IBM compatible).
Data programming mode	Used to read and write frequency data and other features to and from the radio.
PC test mode	Used to check the radio using the PC. This feature is included in the FPU. See panel tuning.
Firmware programming mode	Used when changing the main program of the flash memory.
Clone mode	Used to transfer programming data from one radio to another.
Self programming mode	Frequency, signalling and features.

2. How to Enter Each Mode

Mode	Operation
User mode	Power ON
Panel test mode	[◄]+Power ON (Two seconds) (TK-270G only)
PC mode	Received commands from PC
Panel tuning mode	[Panel test mode]+[○]
Firmware programming mode	[LAMP]+[MONI]+Power ON (Two seconds)
Clone mode	[LAMP]+[►]+Power ON (Two seconds)
Self programming mode	[LAMP]+[●]+Power ON (Two seconds) (TK-270G only)

3. For the panel Test Mode (TK-270G only)

For the setting method, refer to ADJUSTMENT.

3-1. For the panel Tuning Mode

For the setting method, refer to ADJUSTMENT.

REALIGNMENT

4. Checksum

Executing this function, "TUNING" appears on the display of TK-270G while calculating the checksum .

When the calculation is completed, the display returns to normal and PC displays the checksum of the radio.

5.PC Mode

5-1. Preface

The TK-260G/270G transceiver is programmed using a personal computer, a programming interface (KPG-22) and programming software (KPG-56D).

The programming software can be used with an IBM PC or compatible. Figure 1 shows the setup of an IBM PC for programming.

5-2. Connection procedure

1. Connect the TK-260G/270G to the personal computer with the interface cable.
2. When the POWER is switched on, user mode can be entered immediately. When the PC sends a command, the radio enters PC mode.
   When data is transmitted from transceiver, the red LED blinks.
   When data is received by the transceiver, the green LED blinks.

Notes:

- The data stored in the personal computer must match the model type when it is written into the flash memory.
- Change the TK-260G/270G to PC mode, then attach the interface cable.

5-3. KPG-22 description
(PC programming interface cable: Option)

The KPG-22 is required to interface the TK-260G/270G to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level.

The KPG-22 connects the SP/MIC connector of the TK-260G/270G to the computers RS-232C serial port.

5-4. Programming software description

The KPG-56D programming disk is supplied in 3-1/2" disk format. The software on this disk allows a user to program the TK-260G/270G radios via a programming interface cable (KPG-22).

5-5. Programming with IBM PC

If data is transferred to the transceiver from an IBM PC with the KPG-56D, the destination data (basic radio information) for each set can be modified. Normally, it is not necessary to modify the destination data because their values are determined automatically when the frequency range (frequency type) is set.

The values should be modified only if necessary. Data can be programmed into the flash memory in RS-232C format via the universal connector.

KPG-56D installation manual part No. : B62-1153-XX

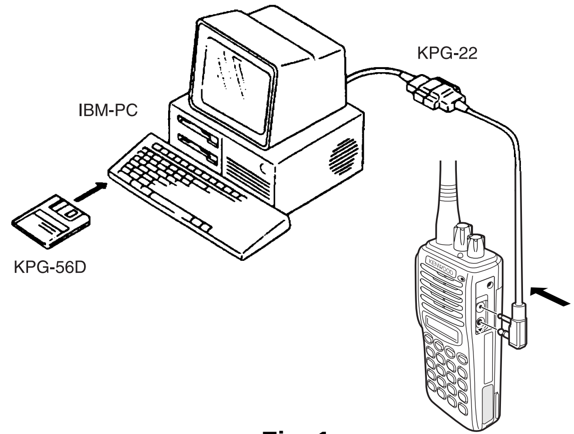


Fig. 1

6. Firmware Programming Mode

6-1. Preface

Flash memory is mounted on the TK-260G/270G. This allows the TK-260G/270G to be upgraded when new features are released in the future. (For details on how to obtain the firmware, contact Customer Service.)

6-2. Connection procedure

Connect the TK-260G/270G to the personal computer (IBM PC or compatible) with the interface cable (KPG-22). (Connection is the same as in the PC Mode.)

6-3. Programming

1. Start up the programming software (KPG-56D), select "firmware program" in the "Program" item, and press the Return key on your personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 57600 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Hold down the [LAMP] and [MON] switches on the TK-260G/270G, and press the power switch.
   When the [LAMP] and [MON] switches are held down for two seconds, "PROG576" appears on the display and the LED lights orange. When "PROG576" is displayed, release the switches (TK-270G only).
6. Check the connection between the TK-260G/270G and the personal computer, and make sure the TK-260G/270G is in Program mode.
7. Press F10 on the personal computer. A window opens on the display to indicate the writing progress. When the TK-260G/270G begins to receive data, the LED lights green.
8. When data is received successfully, a checksum appears on the display.
   (Since the TK-260G does not have a display, check the checksum with the FPU (KPG-56D).)

REALIGNMENT

9. If you want to continue programming other TK-260G/270Gs, repeat steps 5 to 8.

Notes:

- To start the Firmware Programmer from KPG-56D, the Fpro path must be set up by the KPG-56D Setup.
- This mode cannot be entered if the Firmware Programming mode is set to Disable in the Programming software (KPG-56D).
- When programming the firmware, it is recommend to copy the data from the floppy disk to your hard disk before you update the radio firmware.
  Directly copying from the floppy disk to the radio may not work because the access speed is too slow.

6-4. Function

1. If you press the [MON] switch while "PROGXXX" is displayed, the checksum is displayed. If you press the [MON] switch again (while the checksum is displayed), "PROGXXX" is redisplayed.
2. A transmission speed can be selected by pressing the [LAMP] switch while "PROGXXX" is displayed.
   12900 bps: The LED flashes green and red alternately.
   38400 bps: The LED flashes orange.
   57600 bps: The LED lights orange.

Note:

Normally, write in the high-speed mode.

7. Clone Mode

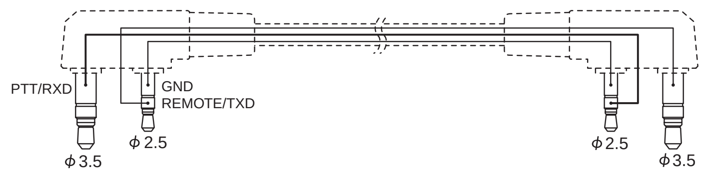
Programming data can be transferred from one radio to another by connecting them via their SP/MIC connectors. The operation is as follows (the transmit radio is the master and the receive radio is the slave).

1. Turn the master TK-270G power ON with the [LAMP]+[►] keys held down. The TK-270G displays "␣␣CLONE␣".
2. Power on the slave TK-260G/270G.
3. Connect the cloning cable to the SP/MIC connectors on the master and slave.
4. Press the [○] key on the master while the master displays "␣␣CLONE␣". The data of the master is sent to the slave. While the slave is receiving the data, "-PC-" is displayed. When cloning of data is completed, the master displays "END", and the slave automatically oprates in the User mode. The slave can then be operated by the same program as the master.
5. The other slave can be continuously cloned. When the [○] key on the master is pressed while the master displays "END", and the slave the master displays "␣␣CLONE␣". Carry out the operation in steps 2 to 4.

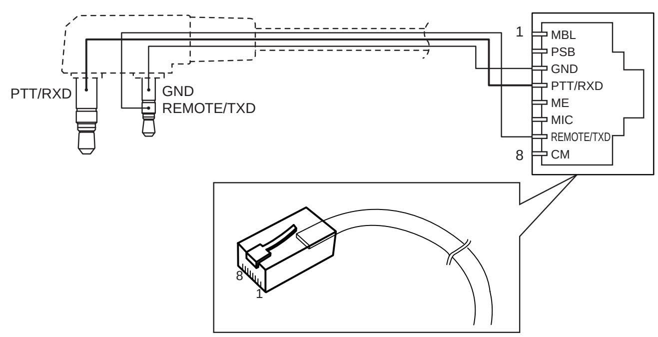
Note: You can clone the programmed data between the tramsceiver listed below.
Frequency version must be same.

Master \ Slave	TK-260G K TK-270G K	TK-260G M TK-270G M	TK-760G K TK-762G K	TK-760G M TK-762G M
TK-270G K	○	×	○	×
TK-270G M	×	○	×	○

Cloning cable parts No.
E30-3410-05 (TK-270G→TK-260G/270G)



E30-3411-05 (TK-270G→TK-760G/762G)



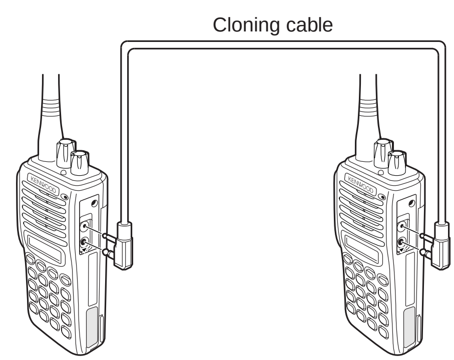


Fig. 2

REALIGNMENT

8. Self Programming Mode (TK-270G only)

Write mode for frequency data and signalling etc. Mainly used by the person maintaining the user equipment.

8.1 Self programming mode setting

Remove D17 from the TX-RX unit (Figure 3) (K models only). Hold down the [LAMP]+[●] switches and turn the power switch on.

When the self programming mode is entered, [SELF] appears on the display. The mode changes automatically to Model Select Mode and "PORTABLE" is displayed in about one second.

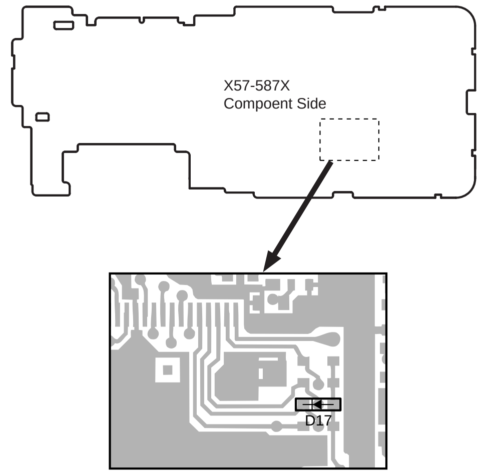
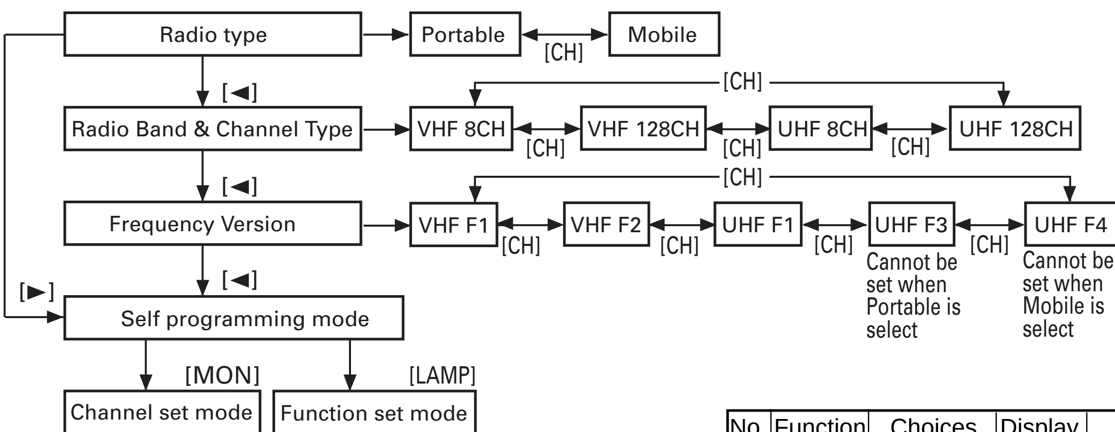


Fig. 3

Note :

This mode (self programming mode) cannot be set when it has been disabled with the FPU.

- **Flow Chart**



Note :

IF the radio type of TK-270G was temporally set to "Mobile" for the cloning purposes, "UNPROG" is displayed (at User Mode) when the TK-270G is turned on.

In this case, please set the radio type back to "Portable" at Model Select Mode menu.

8-2. Channel Setting Mode

This is a mode for making channel settings with the panel keys without using the FPU.

Pressing [MON] when "SELF" is displayed, sets Channel Setting Mode.
Select an item set using [►] then change the selection with the encoder.
The data displayed using [◄] is stored in the memory and then proceeds to the next item. Pressing [►] proceeds to the next item without storing it in the memory.
Press [MON] to set the display to "SELF" and return to reset (default) status.

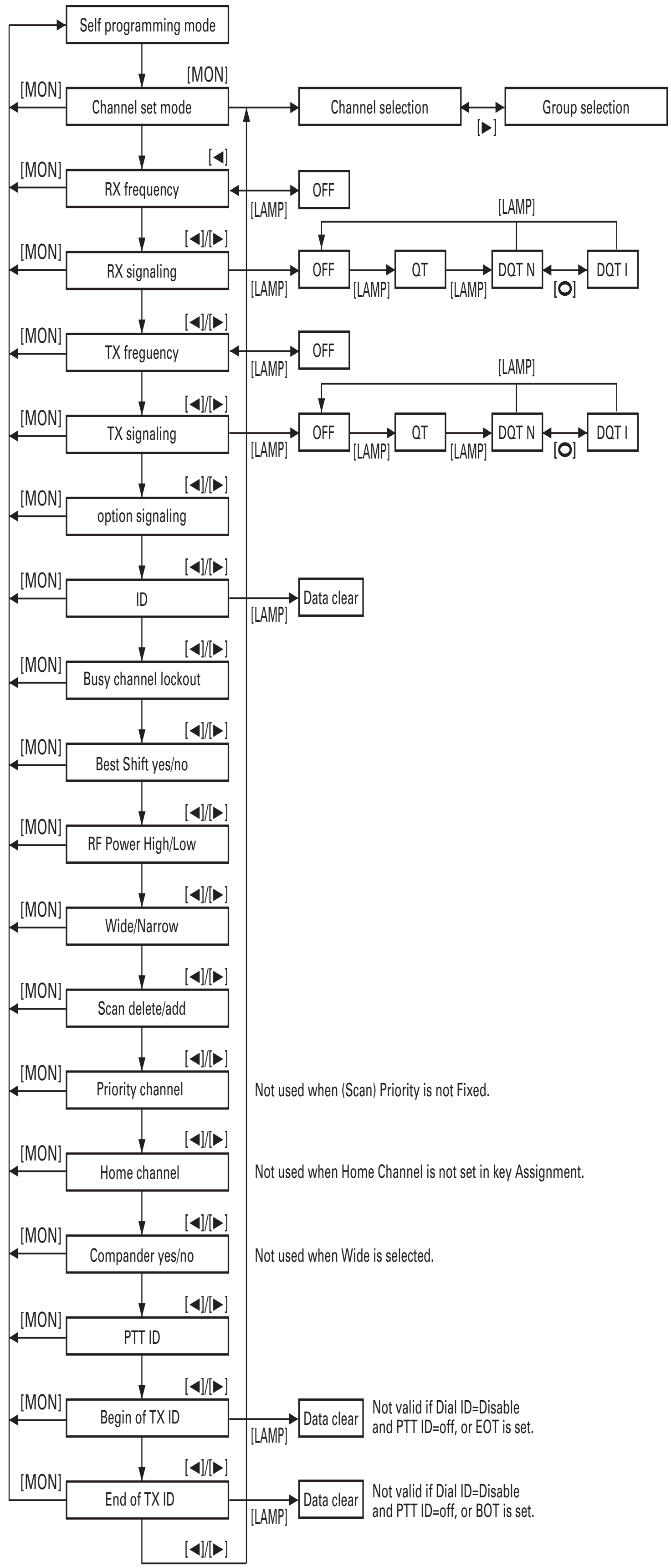
No.	Function	Choices	Display	Remarks
	Select Channel	1-128	_1-_1._	[►] : Group selection/ Channel selection change
			_1-128._	
	Select Group	1-128	_1.-_1_	
			128.-_1_	
1	RX frequency	Step 2.5kHz-1MHz	STP_250	Display when an item is selected or when a step is changed
			STP_1000	(about 0.5 seconds)
				[●] Step change
				VHF : 2.5, 5.0,6.25,7.5kHz,1MHz,Step
		Blank	——	[LAMP] : Freq On/Blank switching
		100.0000-550.0000MHz	R.100.0000	The rightmost dot indicates 50Hz digit (On=5; Off=0).
2	Rx Signaling	OFF	——	[LAMP] : Off/QT/DQT switching
		QT 67.0-250.3Hz (EIA Mode)	QT_67.0_	[●] : Mode switching
			QT_250.3_	[○] : Normal/Inverse switching
		QT 67.0-250.3Hz (0.1Hz Step Mode)	QT_67.0*	
			QT_250.3*	
		DQT 000-777 (Normal) (1 Step Mode)	DQT000N*	
			DQT777N*	
		DQT 023-754 (Normal) (Standard Table Mode)	DQT023N	
			DQT754N	
		DQT 000-777 (Inverse) (1 Step Mode)	DQT000I*	
			DQT777I*	
		DQT 023-754 (Inverse) (Standard Table Mode)	DQT023I	
			DQT754I	

REALIGNMENT

No.	Function	Choices	Display	Remarks
3	TX frequency	Step 2.5kHz-1MHz	STP_250	Same as RX frequency.
			STP_1000	
		Blank	———	
		100.0000-550.0000MHz	T.100.0000	
4	TX Signaling		Same as	RX signaling.
5	Option Signaling	OFF	NONE___	← Default
		DTMF	DTMF___	
		2-TONE	2TONE___	
6	ID	000-9999999999	___ID___	Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		Blank	———	[LAMP] : Data clear
7	Busy Channel Lockout	NO	BCL_NO_	← Default
		Type 1	BCL_1__	BCL_YES for K type
		Type 2	BCL_2__	N/A for K type
8	Beat shift	No	SHFT_NO_	← Default
		Yes	SHFT_YES	
9	RF Power	High Power	PWR_H__	← Default
		Low Power	PWR_L__	
10	Wide/Narrow	Wide	WIDE___	
		Narrow	NARROW_	
11	Scan Delete/ADD	DELETE	SCAN_DEL	Not used for TK-260G
		ADD	SCAN_ADD	← Default
12	Priority Channel	No	P.CH_NO_	Not used when (Scan) Priority is not Fixed.
		Yes	P.CH_YES_	
13	Home Channel	No	H.CH_NO_	Not used when Home Channel is not set in Key Assignment.
		Yes	H.CH_YES_	
14	Compander	No	COMP_NO_	Not used when Wide is selected.
		Yes	COMP_YES	
15	PTT ID	OFF	P.ID_OFF	
		Begin of TX	P.ID_1	
		End of TX	P.ID_2	
		Both	P.ID_3	
16	Begin of TX ID	000-9999999999999999	_BOT_ID_	Not valid if Dial ID =Disable and PTT ID=OFF, or EOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		Blank	———	[LAMP] : Data clear
17	END of TX ID	000-9999999999999999	_EOT_ID_	Not valid if Dial ID =Disable and PTT ID=OFF, or EOT is set. Display when an item is selected (about 0.5 seconds)
			12345678	Display of the current setting (If it is 8 or more digits, scroll it.)
			——987	Display when a code is input (Input it with DTMF key.)
		Blank	———	[LAMP] : Data clear

- **Flow Chart**

Channel Setting Mode



REALIGNMENT

8-3. Function Setting Mode

This is a mode for using the panel keys to make function settings without using the FPU, that operate on all channels.

Pressing the [LAMP] when "SELF" is displayed, sets the Function Setting Mode.
Select an item set using [►] then change the selection with the encoder.
The data displayed using [◄] is stored in the memory and then proceeds to the next item. Pressing [►] proceeds to the next item without storing it in the memory.
Press [LAMP] to display "SELF" and return to reset (default) status.

Function Setting Mode

No.	Function	Choices	Display	Remarks
Function Key				
1	[LAMP]	No Function	LAMP_OFF	
		Talk Around	LAMP_3	* TK-260G cannot be selected.
		Display Character	LAMP_5	* TK-260G cannot be selected.
		Home Channel	LAMP_7	* TK-260G cannot be selected.
		Channel Down	LAMP_8	* TK-260G cannot be selected.
		Channel Up	LAMP_9	* TK-260G cannot be selected.
		Keylock	LAMP_10	* TK-260G cannot be selected.
		Lamp	LAMP_11	← Default(TK-270G) * TK-260G cannot be selected.
		Selectable QT	LAMP_15	* TK-260G cannot be selected. M destination only
		Monitor A	LAMP_17	
		Monitor B	LAMP_18	
		Monitor C	LAMP_19	
		Monitor D	LAMP_20	
		RF Power Low	LAMP_21	
		Scan	LAMP_22	* TK-260G cannot be selected.
		Scan DEL/ADD	LAMP_23	* TK-260G cannot be selected.
		Group Down	LAMP_24	* TK-260G cannot be selected.
		Group Up	LAMP_25	* TK-260G cannot be selected.
		Scramble	LAMP_26	Only when scrambler is set
2	[MONI]	No Function	MON_OFF	
		Talk Around	MON_3	* TK-260G cannot be selected.
		Display Character	MON_5	* TK-260G cannot be selected.
		Home Channel	MON_7	* TK-260G cannot be selected.
		Channel Down	MON_8	* TK-260G cannot be selected.
		Channel Up	MON_9	* TK-260G cannot be selected.
		Keylock	MON_10	* TK-260G cannot be selected.
		Lamp Selectable QT	MON_11 MON_15	* TK-260G cannot be selected. * TK-260G cannot be selected. M destination only
		Monitor A	MON_17	← Default

No.	Function	Choices	Display	Remarks
2	[MONI]	Monitor B	MON_18	
		Monitor C	MON_19	
		Monitor D	MON_20	
		RF Power Low	MON_21	
		Scan	MON_22	* TK-260G cannot be selected.
		Scan DEL/ADD	MON_23	* TK-260G cannot be selected.
		Group Down	MON_24	* TK-260G cannot be selected.
		Group Up	MON_25	* TK-260G cannot be selected.
		Scrambler	MON_26	Only when scrambler is set
3	[○]TK-270G only	No Function	KEY1_OFF	
		Talk Around	KEY1_3	
		Display Character	KEY1_5	
		Home Channel	KEY1_7	
		Channel Down	KEY1_8	
		Channel Up	KEY1_9	
		Keylock	KEY1_10	
		Lamp	KEY1_11	
		Selectable QT	KEY1_15	M destination only
		Monitor A	KEY1_17	
		Monitor B	KEY1_18	
		Monitor C	KEY1_19	
		Monitor D	KEY1_20	
		RF Power Low	KEY1_21	
		Scan	KEY1_22	
		Scan DEL/ADD	KEY1_23	← Default
		Group Down	KEY1_24	
		Group Up	KEY1_25	
		Scrambler	KEY1_26	Only when scrambler is set
4	[●]TK-270G only	No Function	KEY2_OFF	
		Talk Around	KEY2_3	
		Display Character	KEY2_5	
		Home Channel	KEY2_7	
		Channel Down	KEY2_8	
		Channel Up	KEY2_9	
		Keylock	KEY2_10	
		Lamp	KEY2_11	
		Selectable QT	KEY2_15	M destination only
		Monitor A	KEY2_17	
		Monitor B	KEY2_18	
		Monitor C	KEY2_19	
		Monitor D	KEY2_20	
		RF Power Low	KEY2_21	
		Scan	KEY2_22	
		Scan DEL/ADD	KEY2_23	
		Group Down	KEY2_24	

REALIGNMENT

No.	Function	Choices	Display	Remarks
4	[●]TK-270G only	Group Up	KEY2_25	
		Scrambler	KEY2_26	Only when scrambler is set
5	[◄]TK-270G only	No Function	KEY3_OFF	
		Talk Around	KEY3_3	← Default
		Display Character	KEY3_5	
		Home Channel	KEY3_7	
		Channel Down	KEY3_8	
		Channel Up	KEY3_9	
		Keylock	KEY3_10	
		Lamp	KEY3_11	
		Selectable QT	KEY3_15	M destination only
		Monitor A	KEY3_17	
		Monitor B	KEY3_18	
		Monitor C	KEY3_19	
		Monitor D	KEY3_20	
		RF Power Low	KEY3_21	← Default
		Scan	KEY3_22	
		Scan DEL/ADD	KEY3_23	
		Group Down	KEY3_24	
		Group Up	KEY3_25	
		Scrambler	KEY3_26	Only when scrambler is set
6	[►]TK-270G only	No Function	KEY4_OFF	
		Talk Around	KEY4_3	
		Display Character	KEY4_5	
		Home Channel	KEY4_7	
		Channel Down	KEY4_8	
		Channel Up	KEY4_9	
		Keylock	KEY4_10	
		Lamp	KEY4_11	
		Selectable QT	KEY4_15	M destination only
		Monitor A	KEY4_17	
		Monitor B	KEY4_18	
		Monitor C	KEY4_19	
		Monitor D	KEY4_20	
		RF Power Low	KEY4_21	← Default
		Scan	KEY4_22	
		Scan DEL/ADD	KEY4_23	
		Group Down	KEY4_24	
		Group Up	KEY4_25	
		Scrambler	KEY4_26	Only when scrambler is set
7	[CH]	Channel Up/Down	CH_UP/DN	← Default
		Group Up/Down	GR_UP/DN	
		No Function	KNOB_OFF	

No.	Function	Choices	Display	Remarks
		Optional Feature		
8	Power On Tone	YES/NO	PONT_YES	Default:YES
9	Control Tone	YES/NO	CNTT_YES	Default:YES
10	Warning Tone	YES/NO	WART_YES	Default:YES
11	Time Out Timer	OFF,15-300/15s Step	TOT_60	Default:60s
12	TOT Pre-Alert Time	OFF,1-10/ 1s Step	TOTP_PFF	Cannot be set when TOT is OFF. Default:OFF
13	TOT Rekey Time	OFF1-60/ 1s Step	TOTK_OFF	Cannot be set when TOT is OFF. Default:OFF
14	TOT Reset Time	OFF1-15/ 1s Step	TOTS_OFF	Cannot be set when TOT is OFF. Default:OFF
15	Clear to Transpond (BCL for Transpond)	YES	CTT_YES	
		NO	CTT_NO	← Default
16	Battery Save	ON	BATT_ON	← Default
		OFF	BATT_OFF	
17	Signaling	OR	SIG__OR	← Default
		AND	SIG_AND	
18	Squelch Level	0-9/1 Step	SQL__5	Default;5
19	Priority	None	PRI_NONE	← Default
		Fixed	PRI_FIX_	
		Selected	PRI_SEL_	
20	Lock Back Time A	0.5-5.0/0.05	LBA_500	Default:500ms Cannot be set when Priority = none.
21	Lock Back Time B	0.5-5.0/0.05	LBB_2000	Default:2000ms Cannot be set when Priority = none.
22	Revert Channel	Selected	REV_SEL	
		Last Called	REV_L/C_	← Default
		Last Used	REV_L/U_	
		Selected + Talk Back	REV_S/T_	
		Priority	REV_PRI_	
		Priority + Talk Back	REV_P/T_	
23	Dropout Delay Time	0-300/1s	DODT___3	Default;3s
24	Dwell Time	0-300/1s	DWL___3	Default;3s
		DTMF		
25	Digit Time	50-200/10ms	DIGT__50	Default;50ms
26	Inter Digit Time	50-1000/50ms	IDT___50	Default;50ms
27	First Digit Time	50-200/10ms	FDT___50	Default;50ms
28	First Digit Delay	50-1000/50ms	RIST_100	Default;100ms
29	Rise Time with QT	50-1000/50ms	RTWQ_100	Default;100ms
30	DIAL ID	Enable	DID_ENA	
		Diable	DID_DIS	← Default
31	No.of DTMF Key	12Key	NODK_12	← Default
		16Key	NODK_16	
32	DTMF Hold Time	ON	DHT__ON	← Default
		OFF	DHT__OFF	
33	Store and Send	ON	SAS__ENA	
		OFF	SAS__CSQ	← Default

REALIGNMENT

No.	Function	Choices	Display	Remarks
34	D Key Assignment	D Code	DKA_D_CD	← Default
		1-16/1s	DKA_16__	
35	DTMF Signaling	Code SQ	DTMF_OFF	← Default
		SEL CALL	DTMF_SEL	
36	Inter Mediaate Code	0-9,A-D,*,#	IMC__#_	Default: # (Can be set only when DTMF signaling = SEL CALL.)
37	Group Code	0-9,A-D,*,#	GPCD_FF_	Default;OFF
38	Auto Rest Time	OFF	ART_OFF_	
		1-15/1s	ART__10	Default;10s
39	Call Alert/ Transpond	OFF	CA/T_OFF	← Default
		Call Alert	CA/T_C/A	
		Transpond (Call Alert)	CA/T_T/A	
		Transpond (ID Code)	CA/T_T/I	
		Transpond (tanspond Code)	CA/T_T/T	
Others				
40	Panel Test/panel Tuning MODE	Enable	PTM_ENA	← Default (Not used for TK-260G)
		Disable	PTM_DIS	

8-4. Memory Reset Mode

This mode is used to clear data for functions that can be set in Self Programming Mode or to return to reset values (default).

Pressing [O] when "SELF" is shown, sets the display to "CANCEL".

Turning the encoder alternately switches the display between "CANCEL"←→"READY".

Pressing [O] when "READY" is shown, clears the data and sets the display to "CLEAR".

Pressing [O] again, returns the display to "SELF".

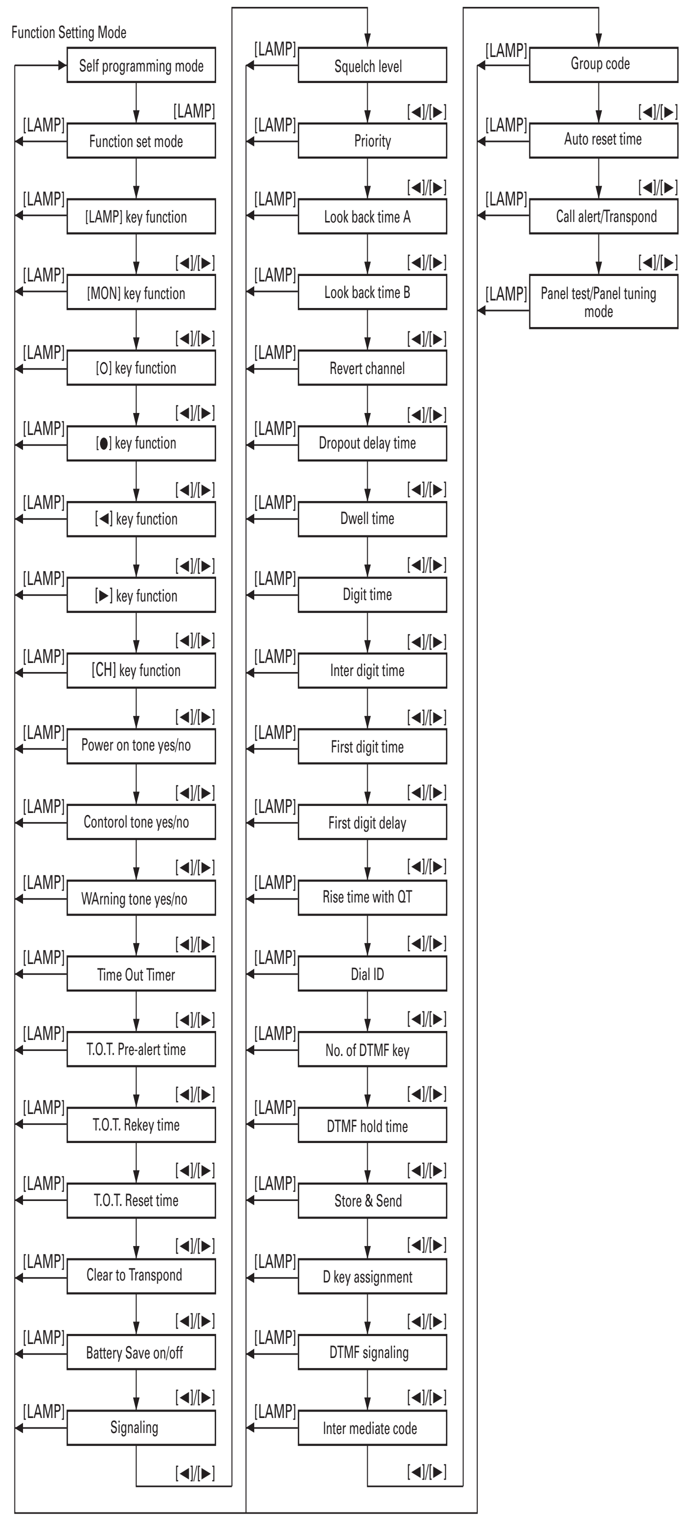
Pressing [O] when "CANCEL" is shown, returns the display to "SELF" without resetting the data.

When the [O] switch is pressed while "SELF" is displayed, the memory is reset.

When the memory is reset, mode data and model data are not reset.

The TK-260G cannot reset the memory.

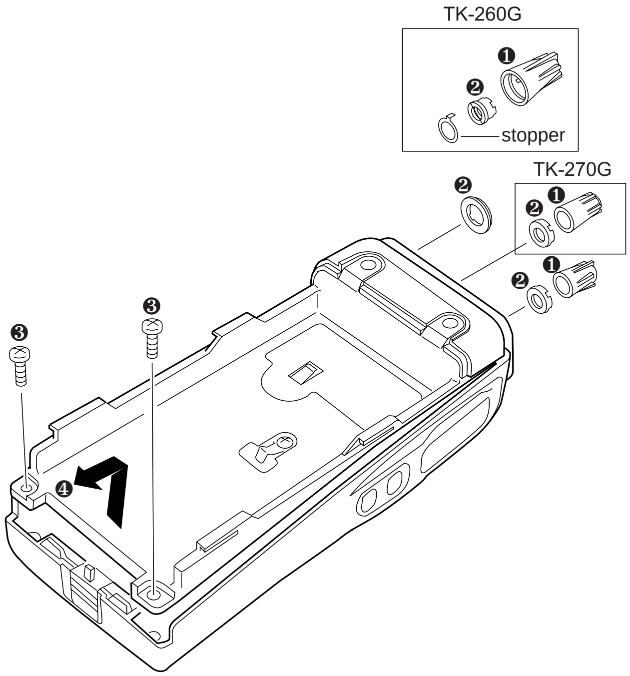
- **Flow Chart**



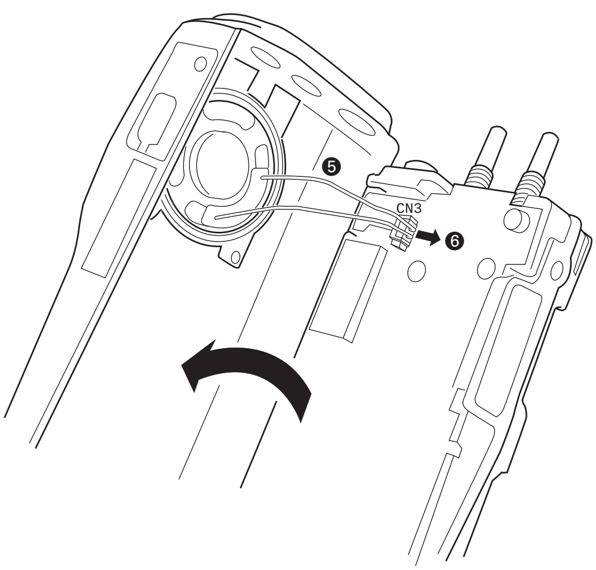
DISASSEMBLY FOR REPAIR

Separating the case assembly from the chassis.

1. Remove the two knobs ❶ and three round units ❷.
2. Remove the two screws ❸.
3. Expand the right and left sides of the bottom of the case assembly, lift the chassis, and remove it from the case assembly ❹.



4. Taking cure not to cut the speaker lead ❺, open the chassis and case assembly, and pull the speaker lead with connector ❻.



Separating the chassis from the unit.

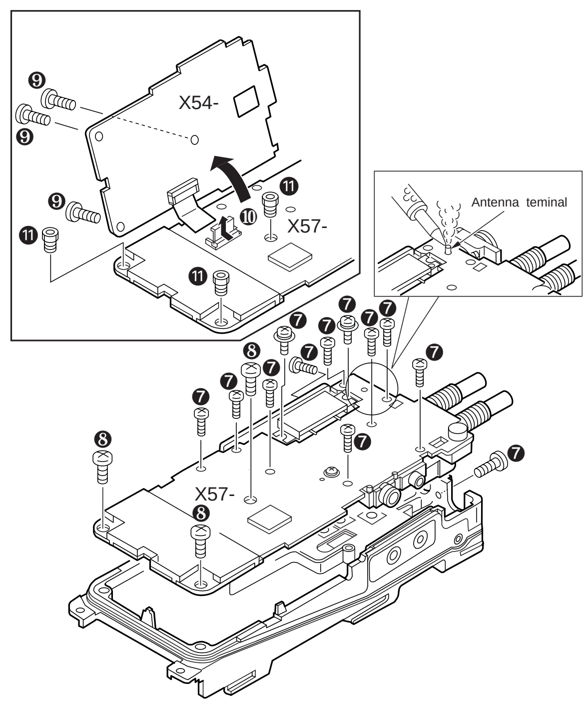
• TK-260G

1. Remove the twelve small screws ❼, and the three large screws ❽.
2. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off (X57).

• TK-270G

1. Remove the three screws ❾.
   Lift the unit (X54), and rise up the connecter lever in the arrow with your finger ❿.
   Remove the three hexagonal bosses⓫, and remove the twelve screws ❼.
2. Remove the solder from the antenna terminal using a soldering iron, then lift the unit off (X57).

TK-270G



CIRCUIT DESCRIPTION

1. Frequency configuration

The receiver utilizes double conversion. The first IF is 49.95 MHz and the second IF is 450 kHz. The first local oscillator signal is supplied form the PLL circuit.

The PLL circuit in the transmitter generates the necessary frequencies. Fig. 1 shows the frequencies.

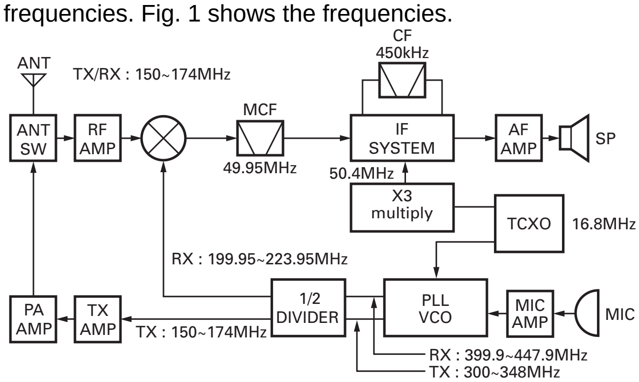


Fig. 1 Frequency configuration

2. Receiver

The frequency configuration of the receiver is shown in Fig. 2.

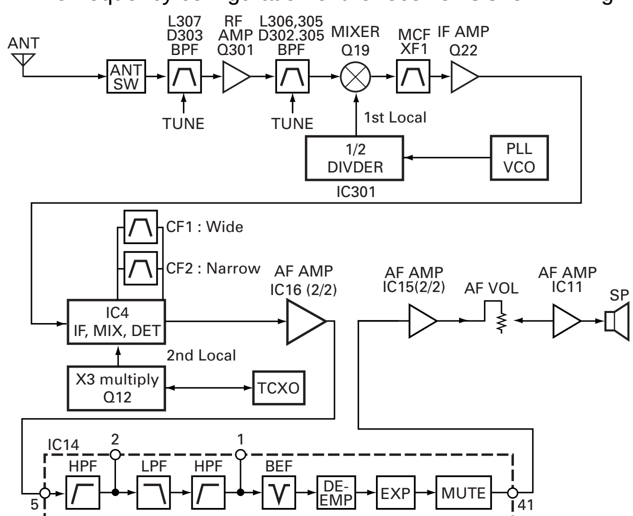


Fig. 2 Receiver section

1) Front end (RF AMP)

The signal coming form the antenna passes through the transmit/receive switching diode circuit, (D3,D7) passes through a BPF(L307), and is amplified by the RF amplifier (Q301).

The resulting signal passes through a BPF (L305 and L306) and goes to the mixer. These BPFs are adjusted by variable capacitors (D302, 303,305). The input voltage to the variable capacitor is regulated by voltage output from the microprocessor (IC13)

2) First mixer

The signal from the front end is mixed with the first local oscillator signal generated in the PLL circuit by Q19 to produce a first IF frequency of 49.95 MHz.

The resulting signal passes through the XF1 MCF to cut the adjacent spurious and provide the opitimun characteristics, such as adjacent frequency selectivity.

3) IF Amplifier circuit

The first IF signal is passed through a four-pole monolithic crystal filter (XF1) to remove the adjacent channel signal. The filtered first IF signal is amplified by the first IF amplifier (Q22) and then applied to the IF system IC (IC4). The IF system IC provides a second mixer, second local oscillator, limiting amplifier, quadrature detector and RSSI (Received Signal Strength Indicator). The second mixer mixes the first IF signal with the 50.4MHz of the second local oscillator output (TCXO X3) and produces the second IF signal of 450kHz.

The second IF signal is passed through the ceramic filter (CF1; Wide, CF2 ; Narrow) to remove the adjacent channel signal. The filtered second IF signal is amplified by the limiting amplifier and demodulated by the quadrature detector with the ceramic discriminator (CD1). The demodulated signal is routed to the audio circuit.

4) Wide/Narrow changeover circuit

Narrow and Wide settings can be made for each channel by switching the ceramic filters CF1 (Wide) and CF2 (Narrow).

The WIDE (high level) and NARROW (low level) data is output from IC5 (OUTPUT EXPANDER), pin 4.

When a WIDE (high level) data is received, Q14 turn off and Q17 turn on. When a NARROW (low level) data is received, Q14 turn on and Q17 turn off. D14 and D13 are switched to ceramic filters when a high/low level data is received.

Q23 turns on/off with the Wide/Narrow data and the IC4 detector output level is changed to maintain a constant output level during wide or narrow signals.

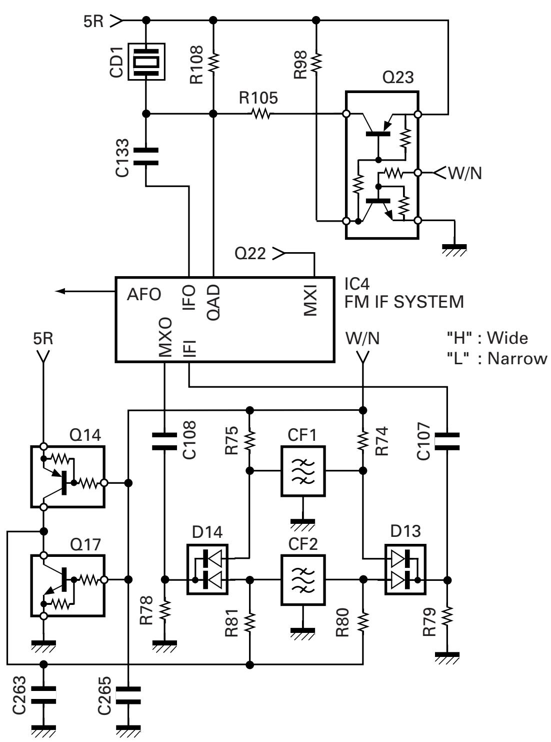


Fig. 3 Wide/Narrow changeover circuit

5) Audio amplifier circuit

The demodulated signal from IC4 is amplified by IC16 (2/2), high-pass filtered, low-pass filtered, high-pass filtered, band-eliminate filtered, and de-emphasized by IC14.
The signal then goes through an AF amplifier IC15 (2/2), an AF volume control (VR2), and is routed to an audio power amplifier (IC11) where it is amplified and output to the speaker.

6) Squelch

Part of the AF signal from the IC enters the FM IC (IC4) again, and the noise component is amplified and rectified by a filter and an amplifier to produce a DC voltage corresponding to the noise level.
The DC signal from the FM IC goes to the analog port of the microprocessor (IC13). IC13 determines whether to output sounds from the speaker by checking whether the input voltage is higher or lower than the preset value.
To output sounds from the speaker, IC6 sends a high signal to the SP MUTE line and turns IC11 on through Q32,Q33,Q34 and Q30.(See Fig. 4)

7) Receive signaling

(1) QT/DQT (Low-speed data)

300Hz and higher audio frequencies of the output signal from IF IC are cut by a low-pass filter (IC19). The resulting signal enters the microprocessor (IC13). IC13 determines whether the QT or DQT matches the preset value, and controls the SP MUTE and the speaker output sounds according to the squelch results.

(2) 2-TONE (High-speed data)

Part of the received AF signal output from the AF amplifier IC16(2/2), and then passes through an audio processor (IC14), goes to the other AF amplifier IC15(1/2), is compared, and ther goes to IC13. IC13 checks whether 2-TONE data is necessary. If it matches, IC13 carries out a specified operation, such as turning the speaker on. (See Fig. 4)

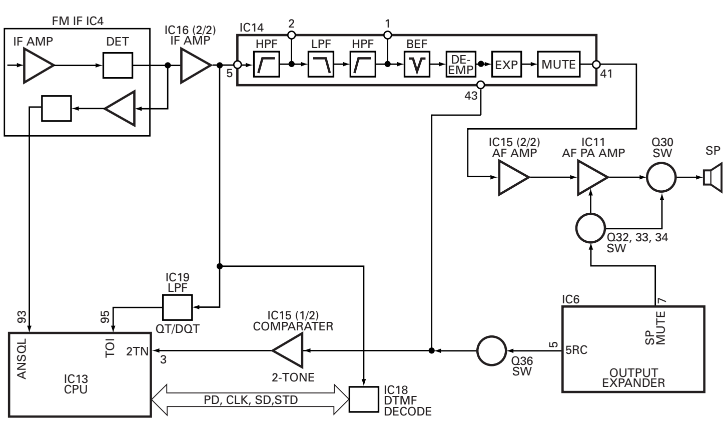


Fig. 4 AF Amplifier and Squelch

(3) DTMF (High-speed data)

The DTMF input signal from the IF IC(IC4) is amplified by IC16(2/2) and goes to IC18, the DTMF decoder. The decoded information is then processed by the CPU. During transmission and standby, the DTMF IC is set to the power down mode when the PD terminal is High. When the line is busy, the PD terminal becomes Low, the power down mode is canceled and decoding is carried out.

3. PLL frequency synthesizer

The PLL circuit generates the first local oscillator signal for reception and the RF signal for transmission.

1) PLL

The frequency step of the PLL circuit is 5 or 6.25kHz.
A 16.8MHz reference oscillator signal is divided at IC2 by a fixed counter to produce an oscillator (VCO) output signal which is buffer amplified by Q3 then divided in IC2 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal from the phase comparator in IC2. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency.(See Fig. 5)

2) VCO

The operating frequency is generated by Q2 in transmit mode and Q10 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D2 and D4 in transmit mode and D9 and D11 in receive mode). The T/R pin is set high in receive mode causing Q7 and Q8 to turn Q2 off and Q10 on.

The T/R pin is set low in transmit mode. The outputs from Q10 and Q2 are amplified by Q3 and sent to the buffer amplifiers.

The outputs from Q3 to Q4 is divided into 1/2 in passing through a Divider IC (IC301), and goes to the RF amplifiers.

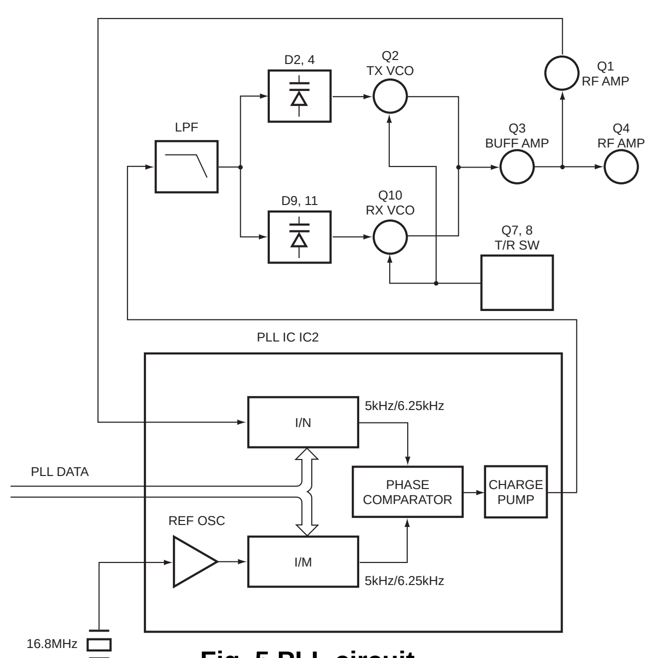


Fig. 5 PLL circuit

3) UNLOCK DETECTOR

If a pulse signal appears at the LD pin of IC2, an unlock condition occurs, and the DC voltage obtained form D1, R1, and C6 causes the voltage applied to the microprocessor to go low. When the microprocessor detects this condition, the transmitter is disabled, ignoring the push-to-talk switch input signal.(See Fig. 6)

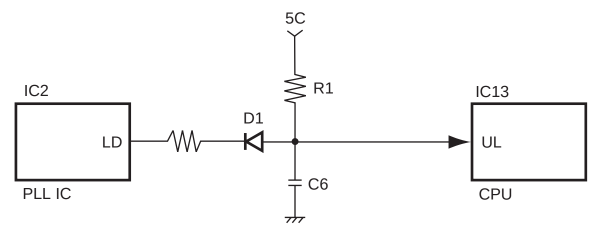


Fig. 6 Unlock detector circuit

4. Transmitter System

1) Microphone amplifier

The signal from the microphone passes through the limitter circuit in D23, and through the high-pass filter, the ALC circuit, the low-pass filter, the high-pass filter, and pre-emphasis/IDC circuit IC14. When encoding DTMF, the mute switch (Q35) is turned OFF for muting the microphone input signal.

The signal passes through the D/A converter (IC17) for the maximum deviation adjustment, and goes to the VCXO modulation input.

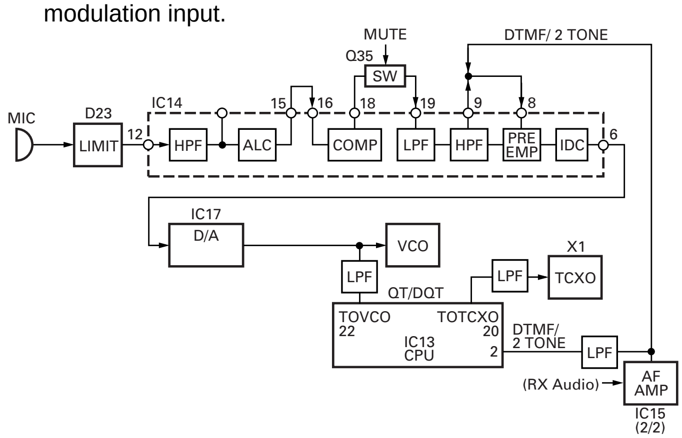


Fig. 7 Microphone amplifier

2) Drive and Final amplifier

The signal from the T/R switch (D5 is on) is amplified by the drive amplifier (Q6) to 50mW.

The output of the drive amplifier is amplified by the RF power amplifier (IC1) to 5.0W (1W when the power is low). The RF power amplifier consists of two MOS FET stages. The output of the RF power amplifier is then passed through the harmonic filter (LPF) and antenna switch (D3 is on) and applied to the antenna terminal.

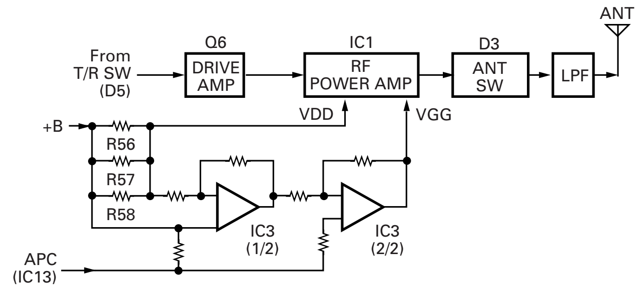


Fig. 8 Drive and final amplifier and APC circuit

3) APC circuit

The APC circuit always monitors the current flowing through the RF power amplifier (IC1) and keeps a constant current. The voltage drop at R56, R57 and R58 is caused by the current flowing through the RF power amplifier and this voltage is applied to the differential amplifier IC3(1/2).

IC3(2/2) compares the output voltage of IC3(1/2) with the reference voltage from IC13, and the output of IC3(2/2) controls the VGG of the RF power amplifier to make both voltages the same.

The change of power high/low is carried out by the change of the reference voltage.

4) Encode signaling

(1) QT/DQT (Low-speed data)

QT,DQT data of the TOTCXO Line is output form pin 20 of the CPU. The signal passes through a low-pass CR filter and goes to the TCXO(X1).

The QT,DQT data of the TOVCO Line is output form pin 22 of the CPU. The signal passes through a low pass CR filter, mixes with the audio signal, and goes to the VCO modulation input. TX deviation is adjusted by the CPU. (See fig.7)

(2) DTMF/2 TONE (High-speed data)

High-speed data is output from pin 2 of the CPU. The signal passes through a low-pass CR filter, and provides a TX and SP out tone, and is then applied to the audio processor (IC14). The signal is mixed with the audio signal and goes to the VCO.

TX deviation is adjusted by the CPU. (See fig.7)

5. Power supply

There are five 5V power supplies for the microprocessor: 5V,5M,5C,5R, and 5T. 5V is always output while the power is on. 5M is always output, but turns off when the power is turned off to prevent malfunction of the microprocessor.

5C is a common 5V and is output when SAVE is not set to OFF.

5R is 5V for reception and output during reception.

5T is 5V for transmission and output during transmission.

CIRCUIT DESCRIPTION

6. Control Circuit

The control circuit consists of a microprocessor (IC13) and its peripheral circuits. It controls the TX-RX unit and transfers data to and from the display unit. IC13 mainly performs the following:

(1) Switching between transmission and reception by the PTT signal input.
(2) Reading system, group, frequency, and program data from the memory circuit.
(3) Sending frequency program data to the PLL.
(4) Controlling squelch on/off by the DC voltage from the squelch circuit.
(5) Controlling the audio mute circuit by the decode data input.
(6) Transmitting tone and encode data.

1) Frequency shift circuit

The microprocessor (IC13) operates at a clock of 9.8304MHz. This oscillator has a circuit that shifts the frequency by BEAT SHIFT SW (Q31).

2) Memory circuit

Memory circuit consists of the CPU (IC13) and a flash memory (IC12). A flash memory has a capacity of 2M bits that contains the transceiver control program for the CPU and data such as transceiver channels and operating features.

This program can be easily written from an external device. Data, such as DTMF memorise and the operating status, are programmed into the EEPROM (IC10).

• Flash Memory

Note : The flash memory holds data such as written with the FPU (KPG-56D), and firmware program (User mode, Test mode, Tuning mode, etc.). This data must be rewritten when replacing the flash memory.

• EEPROM

Note : The EEPROM stores tuning data (Deviation, Squelch, etc.).

Realign the transceiver after replacing the EEPROM.

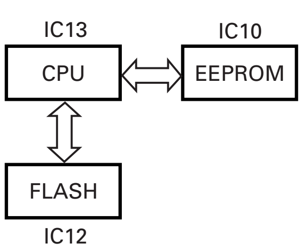


Fig. 9 Memory circuit

3) Low battery warning

The battery voltage is monitored by the microprocessor (IC13). When the battery voltage falls below the voltage set by the Low Battery Warning adjustment, the LED flashes red to notify the operator that it is time to replace the battery. If the battery voltage falls even more (approx. 5.8V), a beep sounds and transmission is stopped.

Low battery warning	Battery condition
The red LED flashes during transmission.	The battery voltage is low but the transceiver is still usable.
The red LED flashes and a continuous beep sounds while PTT is pressed.	The battery voltage is low and the transceiver is not able to make calls.

7. Optional Board Terminal

Terminals for mounting the option board are provided at the bottom edge of the TX-RX unit. The table below shows the correspondence between the board and terminals.

Optional Board Terminal Function (CN5)

Pin	Name	I/O	Function
1	GND	-	GND
2	SB	O	Power output after power switch
3	AUX3	I/O	Board control
4	TXAFI	I	Modulation output from board
5	AUX2	I/O	Board control
6	AUX6	O	Board control
7	AUX1	I	Board control
8	AUX5	O	Board control
9	AUX4	O	Board control
10	TXAFO	O	Modulation input to board
11	5C	O	5V
12	RXAFO	O	Received signal input to board
13	NC	-	NC
14	RXAFI	I	Received signal output from board
15	NC	-	NC
16	ALTTONE	I	ALART TONE output form board
17	NC	-	NC
18	NC	-	NC
19	NC	-	NC
20	GND	-	GND

CIRCUIT DESCRIPTION/SEMICONDUCTOR DATA

8. CONTROL SYSTEM

Keys and channel selector circuit.

The signal from the keys and channel selector are directly input to the microprocessor, as shown in fig. 10.

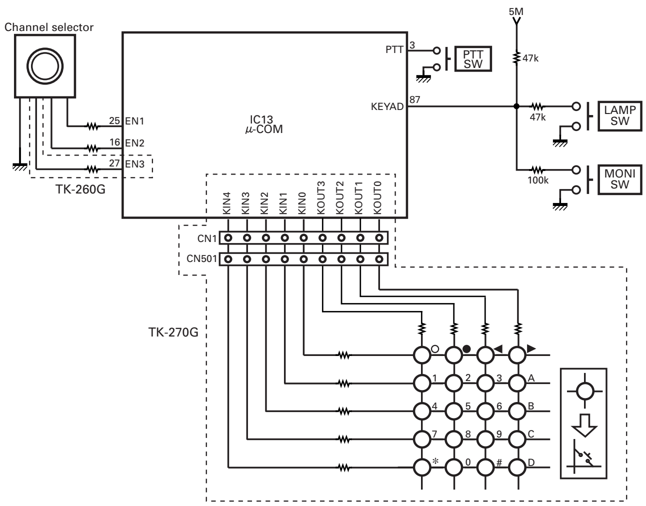
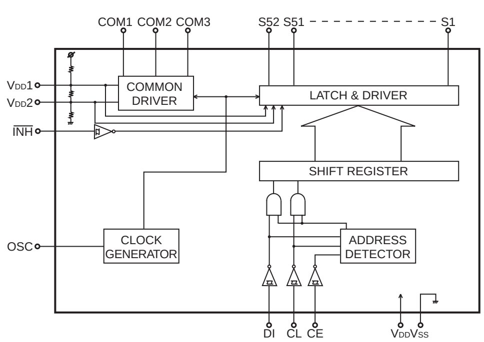


Fig. 10 Control system

SEMICONDUCTOR DATA

LCD Driver : LC75823W (Display UNIT IC501) (TK-270G only)

■ Block diagram

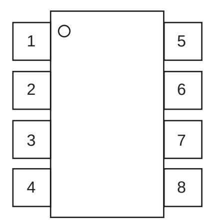


■ Pin function

Pin No.	Name	I/O	Active	Function
1-52	S1-S52	O	-	Segment output for displaying data transferred form serial data.
53-55	COM1-COM3	O	-	Common drive output. Frame frequency fo=(fosc/384)Hz
56	VDD	-	-	
57	$\overline{\text{INH}}$	I	L	The display to turn off $\overline{\text{INT}}$=L : Turn off $\overline{\text{INT}}$=H : Turn on
58	VDD1	I	-	Apply 2/3 the LCD drive bias voltage from outside. If 1/2 the bias is applied, connect to VDD2.
59	VDD2	I	-	Apply 1/3 the LCD drive bias voltage from outside. If 1/2 the bias is applied, connect to VDD1.
60	VSS	-	-	
61	OSC	I/O	-	Oscillation terminal
62	CE	I	H	Chip enable. Serial data transfer terminal. Connected to the microprocessor.
63	CL	I	↑	Synchronizing clock. Serial data transfer terminal. Connected to the microprocessor.
64	DI	I	-	Trnsfer data. Serial data transfer terminal. Connected to the microprocessor.

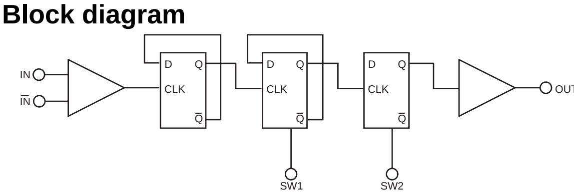
UPB1509GV (IC301)

■ Pin connection diagram



Pin No.	Pin Name
1	V_{CC1}
2	IN
3	$\overline{\text{IN}}$
4	GND
5	SW1
6	SW2
7	OUT
8	V_{CC2}

■ Block diagram



■ Pin Fanction

Pin No.	Pin name	Applied voltage	Pin voltage	Functions and uses
1	V_{CC1}	2.2-2.5	-	Power supply voltage pin for the input amplifier section and division circuit. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).
2	IN	-	1.7-4.95	Signal input pin. Connect a coupling capacitor to this pin for DC cutting with an external circuit (for example, 1000 pF).
3	$\overline{\text{IN}}$	-	1.7-4.95	Input signal bypass pin. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).
4	GND	0	-	Ground pin. Connect it with the ground pattern. The ground pattern on the PC board should be wide enough to minimize impedance.
5	SW1	H/L	-	Division ratio setting pin. The division ratio can be set by the following voltage: (see table below)
6	SW2			Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground.
7	OUT	-	1.0-4.7	Division signal output pin. Emitter follower output. 0.1 Vpf or more can be output under 200-ohmload. Connect a coupling capacitor to this pin for DC cutting with an external circuit (for example,1000 pF).
8	V_{CC2}	2.2-5.5	-	Power supply voltage pin for the output buffer circuit. Connect a bypass capacitor to this pin to reduce the high-frequency impedance with the ground (for example, 1000 pF).

		SW2	
		H	L
SW1	H	1/2	1/4
	L	1/4	1/2

SEMICONDUCTOR DATA

Microprocesser : 30622M4102GP (TX-RX UNIT : IC13)

■ Pin function

Pin No.	Port Name	I/O	Function
1	APC	O	TX:Automatic Power Control data output RX:BPF tuning data
2	DTMF	O	DTMF/2TONE BEEP output
3	2TN	I	2TONE decode pulse input
4	DTMSTD	I	DTMF decode detect detect:H
5	SIM	I	Destnation selct
6	BYTE	I	+5V(5M)
7	CNVSS	I	GND
8	AFSTB	O	Base Band IC strobe/rest output
9	AFFCLK	O	Base Band IC frame rest/system reset output
10	RESET	I	Reset
11	XOUT	O	Clock output
12	VSS	-	GND
13	XIN	I	Clock input
14	VCC	-	+5V
15	NC	I	NC
16	EN2	I	Encoder pulse input 2
17	AUX3	I/O	Option board port 3 *Smar Trunk: Clock output *E Trunk: Step pulse input
18	INT	I	Battery voltage monitor input Low battery:L
19	OE	I	Not used
20	TOTCXO	I	QT/DQT modulation output(TCXO)
21	EEPDAT	I/O	EEPROM data input/output
22	TOVCO	O	QT/DQT modulation output(VCO)
23	AUX1	I	Option board port 1 *Smar Trunk: Req/Ack input *E Trunk: TX Request input
24	SFTSTB	O	Shift register strobe output
25	EN1	O	Encoder pulse input 1
26	DACS	I	Chip select output(Max dev) Select:L
27	EN3	I	CH selector input (TK-260G)
28	NC	O	NC
29	AUX4	O	Option board port 4 *Smar Trunk: Data output
30	AUX2	I/O	Option board port 2 *Smar Trunk: Data input *E Tunk: Synchronizing input
31	KOUT3	O	Key scan output 3
32	KOUT2	O	Key scan output 2
33	TXD	O	Serial data
34	PTT/RXD	I	PTT on: L/Serial data
35	KOUT1	O	Key scan output 1
36	KOUT0	O	Key scan output 0
37	RDY	-	Not used
38	ALE	O	Not used
39	HOLD	I	Not used
40	HLDA	O	Not used
41	BLCK	O	Not used
42	RDY	O	READ signal
43	BHE	O	Not used
44	WR	O	WRITE signal
45	LCDCS	O	LCD chip enable output
46	CNTDAT	O	Common data output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)
47	CNTCLK	O	Common clock output (EEPROM,LCD,SHIFT REG,1bit D/A MODEM)
48	CSO	-	Chip select signal
49	A19	-	Not used
50-59	A18-A9	-	Flash memory address bus
60	ACC	-	+5V
61	A8	-	Flash memory address bus
62	VSS	-	GND
63-70	A7-A0	-	Flash memory address bus
71-75	KIN0-KIN4	I	Key scan input
76	PLLUL	O	PLL unlock detect input unulock: L
77	PLLSTB	O	PLL strobe output Latch: L
78	SAVE	I	Battery save output
79-86	D7-D0	-	Flash memory data bus
87	KEYAD	I	MONI LAMP key input
88	BATT	I	Battery voltage input
89	RFDAT	O	PLL data output
90	RFCLK	O	PLL clock output
91	NC	-	NC
92	RSSQL	I	Receive signal strength indicator input
93	ANLSQL	I	Analog squelch level input
94	AVSS	-	GND
95	TOI	I	QT/DQT signal input
96	VREF	-	Reference voltage input
97	AVCC	-	GND
98	DTMPD	O	DTME IC power control Power down: H
99	DTMCLK	O	DTME IC decode clock output
100	DTMDAT	I	DTME IC decode data input

Shift register 1:BU4094BCFV(IC5)

■ Pin function

Pin No.	Port	I/O	Function
4	W/N	O	Wide/Narrow SW Narrow: L
5	MUTE	O	RX audio/MIC mute Mute: L
6	NC	O	NC
7	LED0	O	RED LED LED lights: H
11	BSHIFT	O	Beat Shift Shift on: H
12	REG2	O	Base Band IC inter register select 2
13	REG1	O	Base Band IC inter register select 1
14	LED1	O	GREEN LED LED lights: H

Shift register 2:BU4094BCFV(IC6)

■ Pin function

Pin No.	Port	I/O	Function
4	5MC	O	5MC control Power on: L
5	5RC	O	5R control Power on: L
6	5TC	O	5T control Power on: H
7	SPMUTE	O	AF amp power supply control Power on: H
11	AUX6	O	Option board port 6
12	AUX5	O	Option board port 5
13	LCDBLK	O	LCD back light Back light on: L
14	RX	O	RX/TX VCO SW RX: L

DESCRIPTION OF COMPONENTS

DISPLAY UNIT (X54-3250-10) (TK-270G Only)

Ref. No.	Use/Function	Operation/Condition
IC501	IC	LCD driver
Q501	Transistor	Current driver / LCD back light LED AVR
Q502	Transistor	DC switch
D505	Diode	Speed up
D506	LED	LCD back light
D507	Diode	Voltage reference
D508~510	LED	LED /Key pad back light
D511	LED	LCD back light
D512~516	LED	LED /Key pad back light

TX-RX UNIT (X57-587X-XX)

Ref. No.	Use/Function	Operation/Condition
IC1	IC	RF Power Module
IC2	IC	PLL system
IC3	IC	Comparator (APC)
IC4	IC	FM IF system
IC5,6	IC	Shift register / Output expander
IC7	IC	Voltage regulator / 5V
IC8	IC	Voltage detector / Reset
IC9	IC	Voltage detector / INT
IC10	IC	EEPROM
IC11	IC	AF Power amplifier
IC12	IC	Flash memory
IC13	IC	Microprocessor
IC14	IC	Audio processor
IC15(1/2)	IC	2Tone amplifier
IC15(2/2)	IC	AF Pre amplifier
IC16(1/2)	IC	Bias buffer
IC16(2/2)	IC	AF Buffer amplifier
IC17	IC	D/A converter (TX AF adjustment)
IC18	IC	DTMF decoder
IC19	IC	Active filter / For LSD in
IC301	IC	VCO 1/2 divider
Q1	Transistor	PLL IC fin amplifier
Q2	Transistor	VCO oscillation (TX)
Q3	Transistor	RF Buffer amplifier
Q4	Transistor	RF amplifier
Q6	Transistor	RF amplifier / TX driver
Q7	FET	DC switch
Q8,Q9	Transistor	DC switch
Q10	FET	VCO oscillation (RX)
Q11	Transistor	Ripple filter
Q12	Transistor	Tripler
Q13	Transistor	DC switch
Q14	Transistor	2nd IF W/N switch sets to on when Narrow
Q15	Transistor	DC switch
Q16	Transistor	DC switch / 5R
Q17	Transistor	2nd IF W/N switch sets to on when Wide
Q18	Transistor	DC switch / 5T, Save
Q19	FET	Mixer
Q20,Q21	Transistor	DC switch / 5T, Save
Q22	Transistor	IF amplifier
Q23	Transistor	DC switch / W/N audio amplitude adjust
Q24	Transistor	DC switch / LED (Red)
Q25	Transistor	DC Switch / LED (Green)
Q26	Transistor	DC switch / Squelch
Q27	FET	DC switch / 5T, Save
Q28	Transistor	DC switch / 5M
Q30	FET	SP Mute switch
Q31	Transistor	Clock frequency shift
Q32~34	Transistor	DC switch / SP Mute
Q35(1/2)	FET	Mute switch / MIC line mute
Q35(2/2)	FET	DC switch
Q36	FET	Mute switch
Q301	FET	RF amplifier
D1	Diode	Unlock detect
D2	Variable capacitance diode	Frequency control
D3	Diode	ANT switch
D4	Variable capacitance diode	Frequency control
D5	Diode	TX/RX switch
D6	Variable capacitance diode	TX modulation
D7	Diode	ANT switch
D8	Zener Diode	Overload protection
D9	Variable capacitance diode	Frequency control
D10	Diode	ANT switch
D11	Variable capacitance diode	Frequency control
D12	Diode	Current steering
D13,14	Diode	RF switch (2nd IF wide/narrow)
D15	Diode	Reverse protection
D17	Diode	Model check
D18	LED	LED/ Red, Green
D19	Diode	Model check
D21	Diode	Voltage drop
D22	Diode	Reverse protection
D23	Diode	Voltage clamp
D302,303,305	Variable capacitance diode	Rf BPF turnig

TK-260G/270G

PARTS LIST

* New Parts. ⚠ indicates safety critical components.
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

L: Scandinavia **K**: USA **P**: Canada
Y: PX (Far East, Hawaii) **T**: England **E**: Europe
Y: AAFES (Europe) **X**: Australia **M**: Other Areas

TK-260G/270G

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-260G/270G					
1	1C	*	A02-2385-23	CABINET ASSY	270G
2	1A	*	A02-2391-23	CABINET ASSY	260G
3	3B,3D	*	A82-0036-02	REAR PANEL	
4	2E		B09-0351-03	CAP(SP/MIC)	
5	2D		B11-1220-03	ILLUMINATION GUIDE	
6	2D	*	B38-0820-05	LCD	270G
7	2F		B46-0470-00	WARRANTY CARD	K
8	2F	*	B62-1113-00	INSTRUCTION MANUAL	270G
9	2F	*	B62-1129-00	INSTRUCTION MANUAL	260G
10	1B	*	D32-0423-05	STOPPER	260G
11	3B,3D		E04-0413-05	RF COAXIAL RECEPTACLE(SMA)	
12	3A,3C		E23-1006-04	RELAY TERMINAL(BATT -)	
13	2A,2D	*	E23-1125-14	RELAY TERMINAL(BATT +)	
14	2D	*	E29-1177-04	INTER CONNECTOR(LCD)	270G
15	2C	*	E37-0805-05	FLAT CABLE(TX/RX-DISP)	270G
16	2B,1D	*	E37-0829-05	SPEAKER LEAD ASSY	
17	3A,3C	*	E37-0830-05	FLAT CABLE(PTT)	
18	2A,2D	*	F10-2302-04	SHIELDING COVER(POWER MODULE)	
19	2A,2C	*	F10-2304-03	SHIELDING COVER(TX/RX UNIT)	
20	2C	*	F20-3307-04	INSULATING SHEET(TX/RX UNIT)	270G
21	2C	*	F20-3308-04	INSULATING SHEET(TX/RX UNIT)	270G
22	1A,1C		G01-0881-04	COIL SPRING(BATT RELEASE)	
23	1D	*	G10-1232-04	FIBROUS SHEET(SPEAKER)	270G
24	1A	*	G10-1233-04	FIBROUS SHEET(SPEAKER)	260G
25	3B,3D	*	G13-1744-14	CUSHION(CHASSIS-BATT)	
26	3A,3D	*	G53-0881-02	PACKING(SIDE)	
27	1D	*	G53-0882-03	PACKING(SPEAKER/ECM)	270G
28	2A,2D	*	G53-0883-04	PACKING(BATT TERMINAL)	
29	1B	*	G53-0884-04	PACKING(ECM)	260G
30	1A	*	G53-0885-04	PACKING(SPEAKER)	260G
31	1A,1C	*	G53-0891-04	PACKING(PTT KNOB)	
32	1E,2F		H12-1487-02	PACKING FIXTURE	
33	1F		H25-0085-04	PROTECTION BAG (100/200/0.07)	
34	2E		H25-2012-04	PROTECTION BAG (75/100/0.08)	
35	3F	*	H52-1413-02	ITEM CARTON CASE	270G
36	3F	*	H52-1417-02	ITEM CARTON CASE	260G
37	1A,1C		J19-1572-04	HOLDER(BATT RELEASE)	
38	2D	*	J19-5352-03	HOLDER(VOL/ENC)	270G
39	2A,2D	*	J19-5353-14	HOLDER(BATT TERMINAL)	
40	2B	*	J19-5355-03	HOLDER(VOL/CHANNEL SW)	260G
41	2E		J21-4493-04	SP/MIC HOLDER	
42	2D	*	J21-8377-03	LCD HOLDER	270G
43	1D	*	J21-8378-04	SPEAKER FIXTURE	270G
44	2A	*	J21-8381-14	SPEAKER FIXTURE	260G
45	2E		J29-0624-03	BELT HOOK	
46	2C	*	J32-0925-04	HEXAGON BOSS	270G
47	1C	*	K29-5330-02	KEY TOP(DTMF)	270G
48	1D	*	K29-5331-03	KNOB(ENCODER)	270G
49	1B,1D	*	K29-5332-03	KNOB(VOLUME)	
50	1A,1C	*	K29-5333-13	BUTTON KNOB(MONI/LAMP)	
51	1A,1C	*	K29-5334-13	BUTTON KNOB(PTT)	
52	1A,1C		K29-5337-03	LEVER KNOB(BATT RELEASE)	
53	1B	*	K29-5341-03	KNOB(CHANNEL SELCTOR)	260G
A	3B,3D		N09-2319-05	BINDING HEAD SCREW	
B	2A,2D	*	N09-2331-05	SPECIAL SCREW	
C	1B,1D		N14-0582-14	CIRCULAR NUT	
D	1B,1D		N14-0583-04	CIRCULAR NUT	
E	1B	*	N14-0588-04	CIRCULAR NUT	260G
F	3A,3C		N30-2606-46	PAN HEAD MACHINE SCREW	
G	2A		N30-3004-46	PAN HEAD MACHINE SCREW	260G
H	2C		N39-2030-46	PAN HEAD MACHINE SCREW	270G
I	2A,2D	*	N67-2005-46	PAN HEAD SEMS SCREW W	
J	3A,3C	*	N78-2045-46	PAN HEAD TAPTITE SCREW	
K	3A,3C	*	N79-2030-46	PAN HEAD TAPTITE SCREW	
L	2A,2C,2D		N83-2005-46	PAN HEAD TAPTITE SCREW	
M	2E	*	N99-2012-05	SCREW SET	
VR2	-	*	R31-0628-15	VARIABLE RESISTOR	
S1	-	*	S60-0413-05	ROTARY SWITCH	260G
SP	1D		T07-0326-05	SPEAKER	270G
SP	2A		T07-0327-05	SPEAKER	260G
ANT	-		T90-0679-05	HELICAL ANTENNA	M
S1	-	*	W02-1969-05	ENCODER	270G
DISPLAY UNIT (X54-3250-10) (TK-270G only)					
D506			B30-2210-05	LED(LCD BACK LIGHT)	
D508-510			B30-2171-05	LED(KEY BACK LIGHT)	
D511			B30-2210-05	LED(LCD BACK LIGHT)	
D512-516			B30-2171-05	LED(KEY BACK LIGHT)	
C501-509			CC73GCH1H221J	CHIP C 220PF J	
C513			CK73GB1H102K	CHIP C 1000PF K	
C515,516			CC73GCH1H101J	CHIP C 100PF J	
CN501		*	E40-6012-05	FLAT CABLE CONNECTOR	
L501,502			L92-0138-05	FERRITE CHIP	
CP501			R90-0748-05	MULTI-COMP 47K X4	
CP502,503			R90-0724-05	MULTI-COMP 1K X4	
R501-510			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R511			R92-1252-05 0	CHIP R 0 OHM	
R512			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R513-515			RK73GB1J103J	CHIP R 10K J 1/16W	
R516			RK73GB1J473J	CHIP R 47K J 1/16W	
R517			RK73GB1J103J	CHIP R 10K J 1/16W	
R518			RK73GB1J471J	CHIP R 470 J 1/16W	
R519-522			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R523			RK73GB1J473J	CHIP R 47K J 1/16W	
R524			RK73GB1J471J	CHIP R 470 J 1/16W	
D501-504			MA2S111	DIODE	
D505			1SS373	DIODE	

260G : TK-260G (K),(M) **M : TK-260G(M),TK-270G(M)**
270G : TK-270G (K),(M) **K : TK-260G(K),TK-270G(K)**

PARTS LIST

TX-RX UNIT (X57-5870-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
D507			MA2S111	DIODE	
IC501			LC75823W	IC(MOS-IC)	
Q501			2SB1132(Q,R)	TRANSISTOR	
Q502			2SC4617(S)	TRANSISTOR	

TX-RX UNIT (X57-5870-XX) -10:TK-260G K,M -11:TK-270G K -21:TK-270G M

Ref. No.	Address	New parts	Parts No.	Description	Destination
D18			B30-2019-05	LED(RED/GRN)	
C1			CK73GB1H471K	CHIP C 470PF K	
C3,4			CC73GCH1H070B	CHIP C 7.0PF B	
C5			CC73GCH1H100C	CHIP C 10PF C	
C6			CK73GB1C104K	CHIP C 0.10UF K	
C8			CC73GCH1H030B	CHIP C 3.0PF B	
C9 ,10			CK73GB1H102K	CHIP C 1000PF K	
C11 ,12			CC73GCH1H180J	CHIP C 18PF J	
C13			CK73GB1H102K	CHIP C 1000PF K	
C14			CC73GCH1H010B	CHIP C 1.0PF B	
C16		*	CC73GCH1H150G	CHIP C 15PF G	
C17			CC73GCH1H060B	CHIP C 6.0PF B	
C18			CC73GCH1H330G	CHIP C 33PF G	
C22			CC73GCH1H101J	CHIP C 100PF J	
C23			CC73GCH1H220G	CHIP C 22PF G	
C24			CC73GCH1H160G	CHIP C 16PF G	
C25			CC73GCH1H130G	CHIP C 13PF G	
C27			CC73GCH1H0R5B	CHIP C 0.5PF B	
C28			CC73GCH1H040C	CHIP C 4.0PF C	
C30			CC73GCH1H100D	CHIP C 10PF D	
C31			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C32			CK73GB1C104K	CHIP C 0.10UF K	
C33			CC73GCH1H050B	CHIP C 5.0PF B	
C35 -37			CK73GB1H102K	CHIP C 1000PF K	
C40 ,41			CK73GB1H102K	CHIP C 1000PF K	
C42 -44			CC73GCH1H101J	CHIP C 100PF J	
C45			CK73GB1H471K	CHIP C 470PF K	
C48 ,49			C92-0001-05	CHIP-C 0.1UF 35WV	
C51			C92-0514-05	CHIP-TAN 2.2UF 10WV	
C52			CC73GCH1H390J	CHIP C 39PF J	
C53			CK73GB1H102K	CHIP C 1000PF K	
C54			CK73FB1C474K	CHIP C 0.47UF K	
C55			CK73GB1H102K	CHIP C 1000PF K	
C57			CK73FB1C474K	CHIP C 0.47UF K	
C58			CK73GB1H103K	CHIP C 0.010UF K	
C60			CK73GB1H103K	CHIP C 0.010UF K	
C62			CC73GCH1H221J	CHIP C 220PF J	
C63			CC73GCH1H050B	CHIP C 5.0PF B	
C64			CC73GCH1H010B	CHIP C 1.0PF B	
C68			C92-0565-05	CHIP-TAN 6.8UF 10WV	
C70			CK73GB1H103K	CHIP C 0.010UF K	
C71			CC73GCH1H101J	CHIP C 100PF J	
C72			CC73GCH1H060B	CHIP C 6.0PF B	
C73			CK73GB1H102K	CHIP C 1000PF K	
C74			CK73FB1E104K	CHIP C 0.10UF K	
C75 ,76			CK73GB1H102K	CHIP C 1000PF K	
C78			CC73GCH1H470J	CHIP C 47PF J	
C81			CC73GCH1H010C	CHIP C 1.0PF C	
C82			CK73GB1H102K	CHIP C 1000PF K	
C84 ,85			CK73GB1H102K	CHIP C 1000PF K	
C86 ,87			CC73GCH1H100D	CHIP C 10PF D	
C88			CC73GCH1H1R5B	CHIP C 1.5PF B	
C89			CC73GCH1H050B	CHIP C 5.0PF B	
C90			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C94			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C95 ,96			CK73GB1H102K	CHIP C 1000PF K	
C98			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C99			CK73GB1C104K	CHIP C 0.10UF K	
C100			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C101			CK73GB1H102K	CHIP C 1000PF K	
C104			CK73GB1H102K	CHIP C 1000PF K	
C107,108			CK73GB1C104K	CHIP C 0.10UF K	
C109			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C110			CK73GB1H103K	CHIP C 0.010UF K	
C111			CK73GB1H102K	CHIP C 1000PF K	
C112			CC73GCH1H020B	CHIP C 2.0PF B	
C113			CK73GB1H471K	CHIP C 470PF K	
C114			CC73GCH1H221J	CHIP C 220PF J	
C115			CK73GB1C104K	CHIP C 0.10UF K	
C118			CK73GB1H102K	CHIP C 1000PF K	
C119			CK73FB1A105K	CHIP C 1.0UF K	
C120,121			CK73GB1H102K	CHIP C 1000PF K	
C122			CK73FB1A105K	CHIP C 1.0UF K	
C123			CC73GCH1H221J	CHIP C 220PF J	
C124			CC73GCH1H100D	CHIP C 10PF D	
C125,126			CK73GB1H103K	CHIP C 0.010UF K	
C128			CC73GCH1H040C	CHIP C 4.0PF C	
C129			CC73GCH1H020C	CHIP C 2.0PF C	
C130			CK73GB1H471K	CHIP C 470PF K	
C131			CC73GCH1H100D	CHIP C 10PF D	
C132			CK73GB1H103K	CHIP C 0.010UF K	
C133			CC73GCH1H820J	CHIP C 82PF J	
C135			CK73GB1H103K	CHIP C 0.010UF K	
C136			CC73GCH1H100D	CHIP C 10PF D	
C137			CK73GB1H102K	CHIP C 1000PF K	
C138			CK73GB1C104K	CHIP C 0.10UF K	
C139			CC73GCH1H181J	CHIP C 180PF J	
C140			CK73GB1H103K	CHIP C 0.010UF K	
C141			CK73GB1C104K	CHIP C 0.10UF K	
C142			CK73FB1A105K	CHIP C 1.0UF K	
C143,144			CK73GB1H102K	CHIP C 1000PF K	
C146,147			CK73GB1C104K	CHIP C 0.10UF K	
C148			CK73GB1H103K	CHIP C 0.010UF K	
C150-153			CK73GB1H102K	CHIP C 1000PF K	
C155			C92-0662-05	CHIP-TAN 15UF 6.3WV	
C156,157			CK73GB1H102K	CHIP C 1000PF K	
C158			CK73FB1A105K	CHIP C 1.0UF K	
C159			CK73GB1H102K	CHIP C 1000PF K	
C161			CK73GB1H102K	CHIP C 1000PF K	
C162			CK73GB1H103K	CHIP C 0.010UF K	
C163,164			CK73GB1H102K	CHIP C 1000PF K	
C165			CK73GB1H103K	CHIP C 0.010UF K	
C166			CK73FF1E104Z	CHIP C 0.10UF Z	
C167			CK73GB1H102K	CHIP C 1000PF K	
C170,171			CK73GB1H471K	CHIP C 470PF K	

260G : TK-260G (K),(M) **M : TK-260G(M),TK-270G(M)**

270G : TK-270G (K),(M) **K : TK-260G(K),TK-270G(K)**

PARTS LIST

TX-RX UNIT (X57-5870-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C173			C92-0567-05	CHIP-TAN 68UF 6.3WV	
C174			CK73GB1H102K	CHIP C 1000PF K	
C176			CC73GCH1H101J	CHIP C 100PF J	
C177			CK73GB1C473K	CHIP C 0.047UF K	
C178			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C179			CK73GB1C104K	CHIP C 0.10UF K	
C180			CK73GB1H103K	CHIP C 0.010UF K	
C181			CK73GB1C393K	CHIP C 0.039UF K	
C182			CK73GB1H102K	CHIP C 1000PF K	
C183,184			CK73GB1C104K	CHIP C 0.10UF K	
C185			CC73GCH1H180J	CHIP C 18PF J	
C189			CK73GB1H103K	CHIP C 0.010UF K	
C190,191			CK73GB1C104K	CHIP C 0.10UF K	
C192,193			CC73GCH1H300J	CHIP C 30PF J	
C194			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C196			CC73GCH1H101J	CHIP C 100PF J	
C198,199			CK73GB1H103K	CHIP C 0.010UF K	
C200			CK73GB1A224K	CHIP C 0.22UF K	
C201			CK73GB1H103K	CHIP C 0.010UF K	
C202,203			CK73GB1C104K	CHIP C 0.10UF K	
C204			CK73FB1C474K	CHIP C 0.47UF K	
C205			CK73GB1H103K	CHIP C 0.010UF K	
C206-208			CK73GB1C104K	CHIP C 0.10UF K	
C209			CK73GB1H332K	CHIP C 3300PF K	
C210			CK73GB1H102K	CHIP C 1000PF K	
C211			C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C212			CK73GB1H122K	CHIP C 1200PF K	
C213			CK73GB1H103K	CHIP C 0.010UF K	
C215			CK73GB1C104K	CHIP C 0.10UF K	
C216			CK73GB1H332K	CHIP C 3300PF K	
C217			CK73GB1E153K	CHIP C 0.015UF K	
C218			CK73FB1H563K	CHIP C 0.056UF K	
C219,220			CK73GB1C104K	CHIP C 0.10UF K	
C221			CK73GB1H471K	CHIP C 470PF K	
C222			CK73GB1H103K	CHIP C 0.010UF K	
C223			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C224			CK73GB1H122K	CHIP C 1200PF K	
C225			CC73GCH1H101J	CHIP C 100PF J	
C226,227			CK73GB1H562K	CHIP C 5600PF K	
C229			CK73FB1H102K	CHIP C 1000PF K	
C230			CK73GB1H562K	CHIP C 5600PF K	
C231			C92-0521-05	CHIP-TAN 0.47UF 20WV	
C232			CK73GB1H471K	CHIP C 470PF K	
C233			CC73GCH1H151J	CHIP C 150PF J	
C234,235			CK73GB1H272K	CHIP C 2700PF K	
C236			CK73GB1C104K	CHIP C 0.10UF K	
C238			CK73GB1H392K	CHIP C 3900PF K	
C239			CK73GB1C104K	CHIP C 0.10UF K	270G
C239			CK73GB1C333K	CHIP C 0.033UF K	260G
C240			CK73GB1H272K	CHIP C 2700PF K	
C241			CK73GB1H102K	CHIP C 1000PF K	
C242			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C243			CK73FB1A105K	CHIP C 1.0UF K	
C244			C92-0560-05	CHIP-TAN 10UF 6.3WV	
C245			CK73GB1H471K	CHIP C 470PF K	
C246			CK73FB1A105K	CHIP C 1.0UF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C247			CK73GB1E123K	CHIP C 0.012UF K	
C248			CK73GB1H103K	CHIP C 0.010UF K	
C249			CK73GB1H222K	CHIP C 2200PF K	
C250			CK73GB1C683K	CHIP C 0.068UF K	
C251			CK73GB1C104K	CHIP C 0.10UF K	
C252			CK73GB1C473K	CHIP C 0.047UF K	
C253,254			CK73GB1H103K	CHIP C 0.010UF K	
C255			CK73GB1H183K	CHIP C 0.018UF K	
C257			CK73GB1E153K	CHIP C 0.015UF K	
C258			CK73GB1C333K	CHIP C 0.033UF K	
C259			CC73GCH1H121J	CHIP C 120PF J	
C260			CK73GB1H183K	CHIP C 0.018UF K	
C261			CK73GB1E153K	CHIP C 0.015UF K	
C262			CK73GB1H102K	CHIP C 1000PF K	
C263			CK73GB1C104K	CHIP C 0.10UF K	
C265,266			CK73GB1C104K	CHIP C 0.10UF K	
C268			CK73GB1H102K	CHIP C 1000PF K	
C269			CK73GB1H152K	CHIP C 1500PF K	
C270			CK73GB1H222K	CHIP C 2200PF K	
C271			CK73GB1H102K	CHIP C 1000PF K	
C301			CK73GB1C104K	CHIP C 0.10UF K	
C303			CK73GB1H102K	CHIP C 1000PF K	
C305			CK73GB1H102K	CHIP C 1000PF K	
C307			CC73GCH1H100D	CHIP C 10PF D	
C308			CK73GB1H102K	CHIP C 1000PF K	
C310			CC73GCH1H220G	CHIP C 22PF G	
C311		*	CC73GCH1H180G	CHIP C 18PF G	
C312			CC73GCH1H220J	CHIP C 22PF J	
C316			CC73GCH1H390J	CHIP C 39PF J	
C317,318			CK73GB1H102K	CHIP C 1000PF K	
C319			CC73GCH1H390J	CHIP C 39PF J	
C320			CK73GB1C104K	CHIP C 0.10UF K	
C323			CK73GB1C104K	CHIP C 0.10UF K	
C324			CC73GCH1H090D	CHIP C 9.0PF D	
C326			CK73GB1H102K	CHIP C 1000PF K	
TC1 ,2			C05-0384-05	CERAMIC TRIMMER CAP(10P)	
CN1		*	E40-6012-05	FLAT CABLE CONNECTOR	270G
CN3			E40-5662-05	PIN ASSY SOCKET	
CN5		*	E40-5932-05	PIN ASSY SOCKET	
J1			E11-0457-05	PHONE JACK (2.5/3.5)	
F1			F53-0130-05	FUSE	
CD1			L79-1474-05	TUNING COIL	
CF1		*	L72-0968-05	CERAMIC FILTER	
CF2		*	L72-0969-05	CERAMIC FILTER	
L2			L92-0138-05	FERRITE CHIP	
L3			L40-3391-86	SMALL FIXED INDUCTOR(3.3U)	
L4			L33-0745-05	SMALL FIXED INDUCTOR	
L5			L34-4548-05	AIR-CORE COIL	
L6			L34-4549-05	AIR-CORE COIL	
L7			L34-4548-05	AIR-CORE COIL	
L9		*	L40-5675-92	SMALL FIXED INDUCTOR(56NH)	
L10			L40-1095-34	SMALL FIXED INDUCTOR(1UH)	
L11			L40-1092-81	SMALL FIXED INDUCTOR	
L12			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)	

260G : TK-260G (K),(M) **M : TK-260G(M),TK-270G(M)**
270G : TK-270G (K),(M) **K : TK-260G(K),TK-270G(K)**

PARTS LIST

TX-RX UNIT (X57-5870-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
L14		*	L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
L15		*	L40-5675-92	SMALL FIXED INDUCTOR(56NH)	
L17			L34-4550-05	AIR-CORE COIL	
L18 -20			L92-0138-05	FERRITE CHIP	
L21			L40-1875-92	SMALL FIXED INDUCTOR(18NH)	
L22		*	L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
L23			L92-0138-05	FERRITE CHIP	
L24			L40-5681-86	SMALL FIXED INDUCTOR(0.56UH)	
L25		*	L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
L26			L33-0745-05	SMALL FIXED INDUCTOR	
L27			L92-0149-05	FERRITE CHIP	
L30		*	L40-2702-86	SMALL FIXED INDUCTOR(27UH)	
L31		*	L40-1085-92	SMALL FIXED INDUCTOR(100NH)	
L32			L40-1005-85	SMALL FIXED INDUCTOR(10UH)	
L35		*	L40-1285-92	SMALL FIXED INDUCTOR(120NH)	
L36		*	L40-1085-85	SMALL FIXED INDUCTOR(0.10UH)	
L37			L40-5685-85	SMALL FIXED INDUCTOR(0.56UH)	
L38			L92-0138-05	FERRITE CHIP	
L39			L92-0149-05	FERRITE CHIP	
L40 ,41			L92-0138-05	FERRITE CHIP	
L42			L92-0131-05	FERRITE CHIP	
L43 ,44			L92-0138-05	FERRITE CHIP	
L302			L33-0745-05	SMALL FIXED INDUCTOR	
L304		*	L40-8288-76	SMALL FIXED INDUCTOR(0.82UH)	
L305		*	L34-4621-05	COIL	
L306		*	L34-4622-05	COIL	
L307			L34-4446-05	COIL	
L308		*	L40-4785-85	SMALL FIXED INDUCTOR(0.47UH)	
X1		*	L77-1794-05	TCXO (16.8MHZ)	
X2		*	L78-0479-05	RESONATOR (3.58MHZ)	
X3		*	L77-1810-05	CRYSTAL RESONATOR(9.8304MHZ)	
XF1		*	L71-0546-05	CRYSTAL FILTER (49.95MHZ)	
CP1			R90-0724-05	MULTI-COMP 1K X4	
CP2 -9			R90-0741-05	MULTIPLE RESISTOR	
CP10			R90-0724-05	MULTI-COMP 1K X4	
CP11 -18			R90-0741-05	MULTIPLE RESISTOR	
CP19			R90-0718-05	MULTI-COMP 4.7K X4	
CP20		*	RK75HA1J472J	CHIP R 4.7K J 1/16W	
R1			RK73GB1J124J	CHIP R 120K J 1/16W	
R2			RK73GB1J104J	CHIP R 100K J 1/16W	
R3			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R4			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R5			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R6			R92-1252-05	CHIP R 0 OHM	
R7			RK73GB1J100J	CHIP R 10 J 1/16W	
R8			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R10			RK73GB1J331J	CHIP R 330 J 1/16W	
R13			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R14			RK73GB1J561J	CHIP R 560 J 1/16W	
R16			RK73GB1J391J	CHIP R 390 J 1/16W	
R17			RK73GB1J103J	CHIP R 10K J 1/16W	
R18			RK73GB1J124J	CHIP R 120K J 1/16W	
R19			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R20			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R21			RK73GB1J221J	CHIP R 220 J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R22			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R23			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R26			RK73GB1J561J	CHIP R 560 J 1/16W	
R27			RK73GB1J270J	CHIP R 27 J 1/16W	
R28 ,29			RK73GB1J271J	CHIP R 270 J 1/16W	
R30			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R31			RK73GB1J101J	CHIP R 100 J 1/16W	
R33			RK73GB1J101J	CHIP R 100 J 1/16W	
R34			RK73GB1J473J	CHIP R 47K J 1/16W	
R35			RK73GB1J104J	CHIP R 100K J 1/16W	
R36			RK73GB1J473J	CHIP R 47K J 1/16W	
R37			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R38			RK73GB1J101J	CHIP R 100 J 1/16W	
R39			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R40			RK73GB1J183J	CHIP R 18K J 1/16W	
R41			RK73GB1J101J	CHIP R 100 J 1/16W	
R42			RK73GB1J220J	CHIP R 22 J 1/16W	
R43			RK73GB1J101J	CHIP R 100 J 1/16W	
R44			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R45			RK73GB1J331J	CHIP R 330 J 1/16W	
R46			RN73GH1J154D	CHIP R 150K D 1/16W	
R47			RK73GB1J104J	CHIP R 100K J 1/16W	
R48			RK73GB1J334J	CHIP R 330K J 1/16W	
R49			RK73GB1J103J	CHIP R 10K J 1/16W	
R50			RN73GH1J154D	CHIP R 150K D 1/16W	
R51			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R52			RK73GB1J151J	CHIP R 150 J 1/16W	
R53			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R54			RN73GH1J154D	CHIP R 150K D 1/16W	
R55			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R56 -58			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
R59			RN73GH1J154D	CHIP R 150K D 1/16W	
R60			R92-1252-05	CHIP R 0 OHM	
R61			RK73GB1J473J	CHIP R 47K J 1/16W	
R62			RN73GH1J154D	CHIP R 150K D 1/16W	
R64 ,65			RK73GB1J104J	CHIP R 100K J 1/16W	
R68			RN73GH1J154D	CHIP R 150K D 1/16W	
R69			RK73GB1J220J	CHIP R 22 J 1/16W	
R70			RK73GB1J104J	CHIP R 100K J 1/16W	
R71			RK73GB1J124J	CHIP R 120K J 1/16W	
R72			RK73GB1J103J	CHIP R 10K J 1/16W	
R73			RK73GB1J273J	CHIP R 27K J 1/16W	
R74 ,75			RK73GB1J223J	CHIP R 22K J 1/16W	
R76			R92-0670-05	CHIP R 0 OHM	
R77			R92-1252-05	CHIP R 0 OHM	
R78 ,79			RK73GB1J153J	CHIP R 15K J 1/16W	
R80 ,81			RK73GB1J223J	CHIP R 22K J 1/16W	
R82			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R83			RK73GB1J103J	CHIP R 10K J 1/16W	
R84			RK73GB1J184J	CHIP R 180K J 1/16W	
R85			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R86			RK73GB1J124J	CHIP R 120K J 1/16W	
R87			RK73GB1J221J	CHIP R 220 J 1/16W	
R88			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R89			RK73GB1J821J	CHIP R 820 J 1/16W	
R90 ,91			RK73GB1J332J	CHIP R 3.3K J 1/16W	

260G : TK-260G (K),(M) **M : TK-260G(M),TK-270G(M)**
270G : TK-270G (K),(M) **K : TK-260G(K),TK-270G(K)**

PARTS LIST

TX-RX UNIT (X57-5870-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R92			RK73GB1J100J	CHIP R 10 J 1/16W	
R93			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R94			RK73GB1J681J	CHIP R 680 J 1/16W	
R95			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R96			RK73GB1J151J	CHIP R 150 J 1/16W	
R97			RK73GB1J183J	CHIP R 18K J 1/16W	
R98			RK73GB1J473J	CHIP R 47K J 1/16W	
R99			RK73GB1J684J	CHIP R 680K J 1/16W	
R100			RK73GB1J473J	CHIP R 47K J 1/16W	
R101			RK73GB1J104J	CHIP R 100K J 1/16W	
R102,103			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R104			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R105			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R106			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R107			RK73GB1J470J	CHIP R 47 J 1/16W	
R108			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R109			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R110,111			RK73GB1J103J	CHIP R 10K J 1/16W	
R112			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R113			RK73GB1J391J	CHIP R 390 J 1/16W	
R114,115			RK73GB1J103J	CHIP R 10K J 1/16W	
R116,117			RK73GB1J153J	CHIP R 15K J 1/16W	
R118			RK73GB1J473J	CHIP R 47K J 1/16W	
R119			R92-1252-05	CHIP R 0 OHM	
R120,121			RK73GB1J473J	CHIP R 47K J 1/16W	
R122			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R123			RK73GB1J104J	CHIP R 100K J 1/16W	
R124			RK73GB1J334J	CHIP R 330K J 1/16W	
R126			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R127			RK73GB1J333J	CHIP R 33K J 1/16W	
R128			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R129			RK73GB1J224J	CHIP R 220K J 1/16W	
R130			R92-1252-05	CHIP R 0 OHM	
R131			RK73GB1J101J	CHIP R 100 J 1/16W	
R132			RK73GB1J104J	CHIP R 100K J 1/16W	
R133			R92-1252-05	CHIP R 0 OHM	
R135			RK73GB1J100J	CHIP R 10 J 1/16W	
R137			RK73GB1J101J	CHIP R 100 J 1/16W	
R138			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R139			RK73GB1J151J	CHIP R 150 J 1/16W	
R140			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R142			R92-1252-05	CHIP R 0 OHM	
R143			RK73GB1J184J	CHIP R 180K J 1/16W	
R144			R92-1252-05	CHIP R 0 OHM	
R145			RK73GB1J474J	CHIP R 470K J 1/16W	
R146			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R147			RK73GB1J470J	CHIP R 47 J 1/16W	
R148			RK73GB1J220J	CHIP R 22 J 1/16W	
R149			RK73GB1J104J	CHIP R 100K J 1/16W	
R150			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R151			RK73GB1J473J	CHIP R 47K J 1/16W	
R152			RK73GB1J823J	CHIP R 82K J 1/16W	
R153			RK73GB1J104J	CHIP R 100K J 1/16W	
R154			RK73GB1J564J	CHIP R 560K J 1/16W	
R155			RK73GB1J473J	CHIP R 47K J 1/16W	
R156			RN73GH1J683D	CHIP R 68K D 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R157			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R158			R92-1252-05	CHIP R 0 OHM	
R159			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R160			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R161			RK73GB1J563J	CHIP R 56K J 1/16W	
R162			RN73GH1J333D	CHIP R 33K D 1/16W	
R163			RN73GH1J274D	CHIP R 270K D 1/16W	
R164			RK73GB1J184J	CHIP R 180K J 1/16W	
R165			RK73GB1J473J	CHIP R 47K J 1/16W	
R166			RK73GB1J103J	CHIP R 10K J 1/16W	
R167			RK73GB1J564J	CHIP R 560K J 1/16W	
R168			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R169			RK73GB1J473J	CHIP R 47K J 1/16W	
R170			RK73GB1J394J	CHIP R 390K J 1/16W	
R171			RK73GB1J474J	CHIP R 470K J 1/16W	
R172			RK73GB1J473J	CHIP R 47K J 1/16W	
R173			RK73GB1J104J	CHIP R 100K J 1/16W	
R174			R92-1252-05	CHIP R 0 OHM	
R175			RK73GB1J103J	CHIP R 10K J 1/16W	
R176			R92-1252-05	CHIP R 0 OHM	
R177			RK73GB1J473J	CHIP R 47K J 1/16W	
R178,179			RK73GB1J104J	CHIP R 100K J 1/16W	
R180			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R181			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R182,183			R92-1252-05	CHIP R 0 OHM	
R184			RK73GB1J333J	CHIP R 33K J 1/16W	
R185			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R186			RK73GB1J155J	CHIP R 1.5M J 1/16W	
R198			RK73GB1J154J	CHIP R 150K J 1/16W	
R199			RK73GB1J103J	CHIP R 10K J 1/16W	
R200			RK73GB1J101J	CHIP R 100 J 1/16W	
R201			R92-1252-05	CHIP R 0 OHM	
R202			RK73GB1J474J	CHIP R 470K J 1/16W	
R203			R92-1252-05	CHIP R 0 OHM	
R204			RK73GB1J104J	CHIP R 100K J 1/16W	
R205			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R206			RK73GB1J471J	CHIP R 470 J 1/16W	
R207			RK73GB1J101J	CHIP R 100 J 1/16W	
R208			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R209			RK73GB1J224J	CHIP R 220K J 1/16W	
R210			RK73GB1J474J	CHIP R 470K J 1/16W	
R211			RK73GB1J103J	CHIP R 10K J 1/16W	
R212			RN73GH1J683D	CHIP R 68K D 1/16W	
R213			RN73GH1J682D	CHIP R 6.8K D 1/16W	
R214			RK73GB1J184J	CHIP R 180K J 1/16W	
R215			RK73GB1J474J	CHIP R 470K J 1/16W	
R218			R92-1252-05	CHIP R 0 OHM	
R219			RK73GB1J273J	CHIP R 27K J 1/16W	
R220,221			RK73GB1J184J	CHIP R 180K J 1/16W	
R222			RK73GB1J153J	CHIP R 15K J 1/16W	
R223			RK73GB1J223J	CHIP R 22K J 1/16W	
R224			RK73GB1J103J	CHIP R 10K J 1/16W	
R225			RK73GB1J153J	CHIP R 15K J 1/16W	
R226			R92-1252-05	CHIP R 0 OHM	
R230			RK73GB1J223J	CHIP R 22K J 1/16W	
R231			RK73GB1J104J	CHIP R 100K J 1/16W	

260G : TK-260G (K),(M) **M : TK-260G(M),TK-270G(M)**
270G : TK-270G (K),(M) **K : TK-260G(K),TK-270G(K)**

PARTS LIST

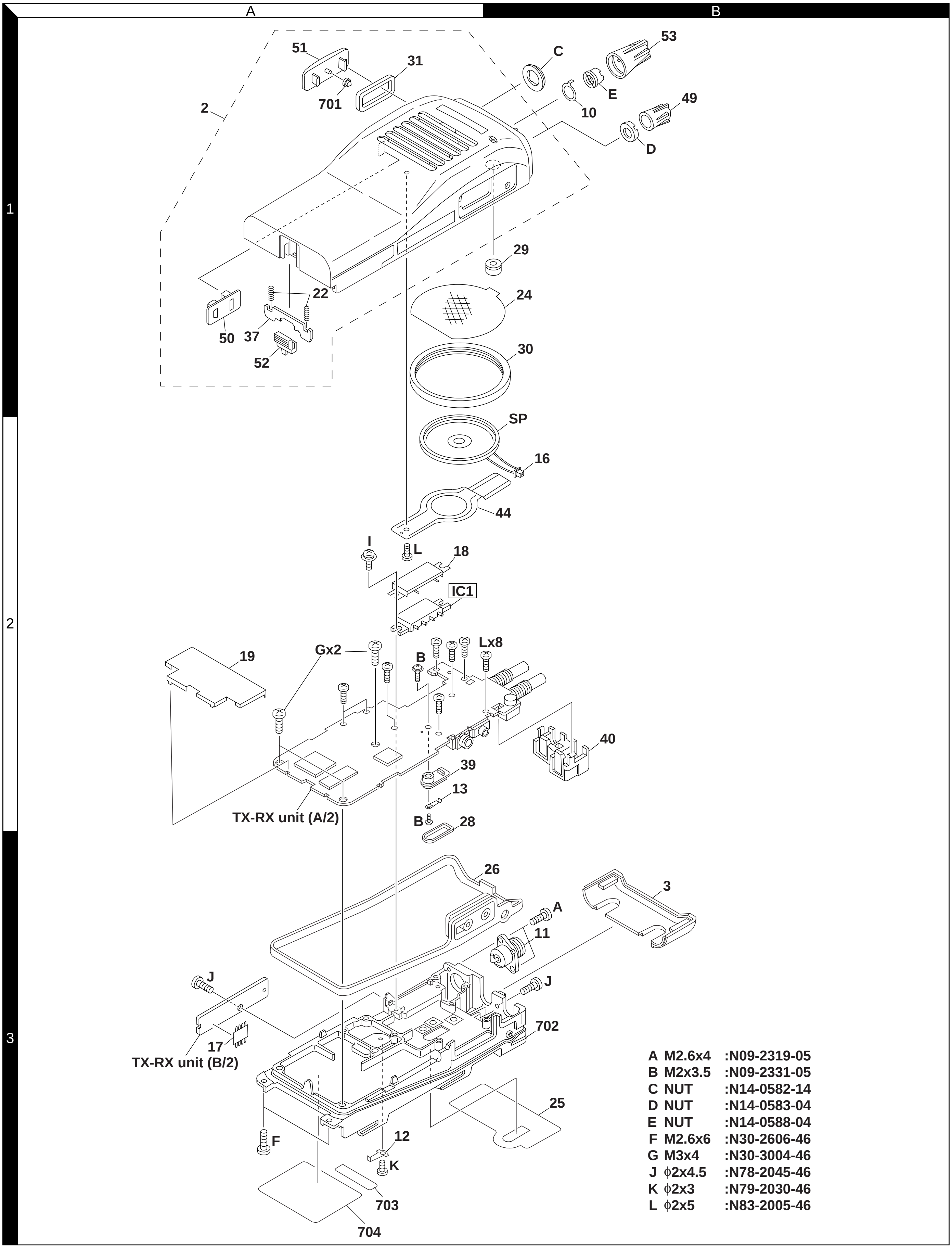
TX-RX UNIT (X57-5870-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R232			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R233			R92-1252-05	CHIP R 0 OHM	
R234			RK73GB1J124J	CHIP R 120K J 1/16W	
R235			RK73GB1J334J	CHIP R 330K J 1/16W	
R237			R92-1252-05	CHIP R 0 OHM	
R239			RK73GB1J153J	CHIP R 15K J 1/16W	
R240			RK73GB1J223J	CHIP R 22K J 1/16W	
R241			RK73GB1J334J	CHIP R 330K J 1/16W	
R242			R92-1252-05	CHIP R 0 OHM	
R244			RK73GB1J561J	CHIP R 560 J 1/16W	
R249			R92-1252-05	CHIP R 0 OHM	
R250			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R252,253			R92-1252-05	CHIP R 0 OHM	
R256-258			R92-1252-05	CHIP R 0 OHM	
R259			RK73GB1J473J	CHIP R 47K J 1/16W	
R260,261			RK73GB1J224J	CHIP R 220K J 1/16W	
R301			R92-0679-05	CHIP R 0 OHM	
R302			R92-1252-05	CHIP R 0 OHM	
R303			RK73GB1J101J	CHIP R 100 J 1/16W	
R304			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R305			R92-1252-05	CHIP R 0 OHM	
R306			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R308			R92-0670-05	CHIP R 0 OHM	
R311			RK73GB1J221J	CHIP R 220 J 1/16W	
R312-314			RK73GB1J104J	CHIP R 100K J 1/16W	
R316			RK73GB1J470J	CHIP R 47 J 1/16W	
R318			R92-1252-05	CHIP R 0 OHM	
R319			RK73GB1J102J	CHIP R 1.0K J 1/16W	
VR1			R12-7491-05	TRIMMING POT.(68K/8)	
S401			S70-0457-05	TACT SWITCH	
S402,403			S70-0424-05	TACT SWITCH	
MIC1			T91-0579-05	MIC ELEMENT	
D1			MA2S111	DIODE	
D2		*	MA2SV05	VARIABLE CAPACITANCE DIODE	
D3			HVU131	DIODE	
D4		*	MA2SV05	VARIABLE CAPACITANCE DIODE	
D5			HSC277	DIODE	
D6			MA360	VARIABLE CAPACITANCE DIODE	
D7			HSC277	DIODE	
D8			MA8062	ZENER DIODE	
D9			MA2S304	VARIABLE CAPACITANCE DIODE	
D10			HSC277	DIODE	
D11			MA2S304	VARIABLE CAPACITANCE DIODE	
D12			MA2S111	DIODE	
D13 ,14			DAN235E	DIODE	
D15			HSC277	DIODE	
D17			MA2S111	DIODE	K
D19			MA2S111	DIODE	260G
D21			1SS373	DIODE	
D22			1SR154-400	DIODE	
D23			RB706F-40	DIODE	
D302,303			HVC350B	VARIABLE CAPACITANCE DIODE	
D305			HVC350B	VARIABLE CAPACITANCE DIODE	
IC1			PF0314-03	IC(RF POWER AMP)	
IC2			MB15A02	IC	
IC3			NJM2904V	IC(APC)	
IC4			TA31136FN	IC(FM IF DETECTOR)	
IC5 ,6			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)	
IC7			S-81350HG-KD	IC(VOLTAGE REGULATOR)	
IC8			PST9140NR	IC(RESET SW)	
IC9			RN5VL45C	IC(REGULATOR)	
IC10			AT2408N10SI2.5	IC(8kbit SERIAL EEPROM)	
IC11			TA7368F	IC(AF POWER AMP)	
IC12			AT29C020-90TI	IC	
IC13		*	30622M4102GP	MPU	
IC14			TC35453F	IC(AUDIO PROCESSOR)	
IC15			TA75W01FU	IC(OP AMP X2)	
IC16			TC75W51FU	IC(OP AMP X2)	
IC17			X9C103SI	IC(TERMINAL VOLTAGE)	
IC18			LC73872M	IC(DTMF RECEIVER)	
IC19			TA75W01FU	IC(OP AMP X2)	
IC301			UPB1509GV	IC	
Q1			2SC5108(Y)	TRANSISTOR	
Q2			2SC4226(R24)	TRANSISTOR	
Q3 ,4			2SC5108(Y)	TRANSISTOR	
Q6			2SC4988	TRANSISTOR	
Q7			2SJ243	FET	
Q8			UMC4	TRANSISTOR	
Q9			DTC144EE	DIGITAL TRANSISTOR	
Q10			2SK508NV(K52)	FET	
Q11			2SC4617(S)	TRANSISTOR	
Q12			2SC4649(N,P)	TRANSISTOR	
Q13 ,14			DTA144EE	DIGITAL TRANSISTOR	
Q15			DTC114EE	DIGITAL TRANSISTOR	
Q16			DTA114YE	DIGITAL TRANSISTOR	
Q17			DTC144EE	DIGITAL TRANSISTOR	
Q18			FP210	TRANSISTOR	
Q19		*	3SK166A	FET	
Q20 ,21			UMG3N	TRANSISTOR	
Q22			2SC4619	TRANSISTOR	
Q23			UMC4	TRANSISTOR	
Q24 ,25			DTC114EE	DIGITAL TRANSISTOR	
Q26			DTA114EE	DIGITAL TRANSISTOR	
Q27			UPA572T	FET	
Q28			DTA114YE	DIGITAL TRANSISTOR	
Q30			2SK1588	FET	
Q31			2SC4619	TRANSISTOR	
Q32			2SA1362(GR)	TRANSISTOR	
Q33 ,34			DTC144EE	DIGITAL TRANSISTOR	
Q35			UPA672T	FET	
Q36			2SK1824	FET	
Q301			2SK1215(E)	FET	

260G : TK-260G (K),(M)　　**M : TK-260G(M),TK-270G(M)**

270G : TK-270G (K),(M)　　**K : TK-260G(K),TK-270G(K)**

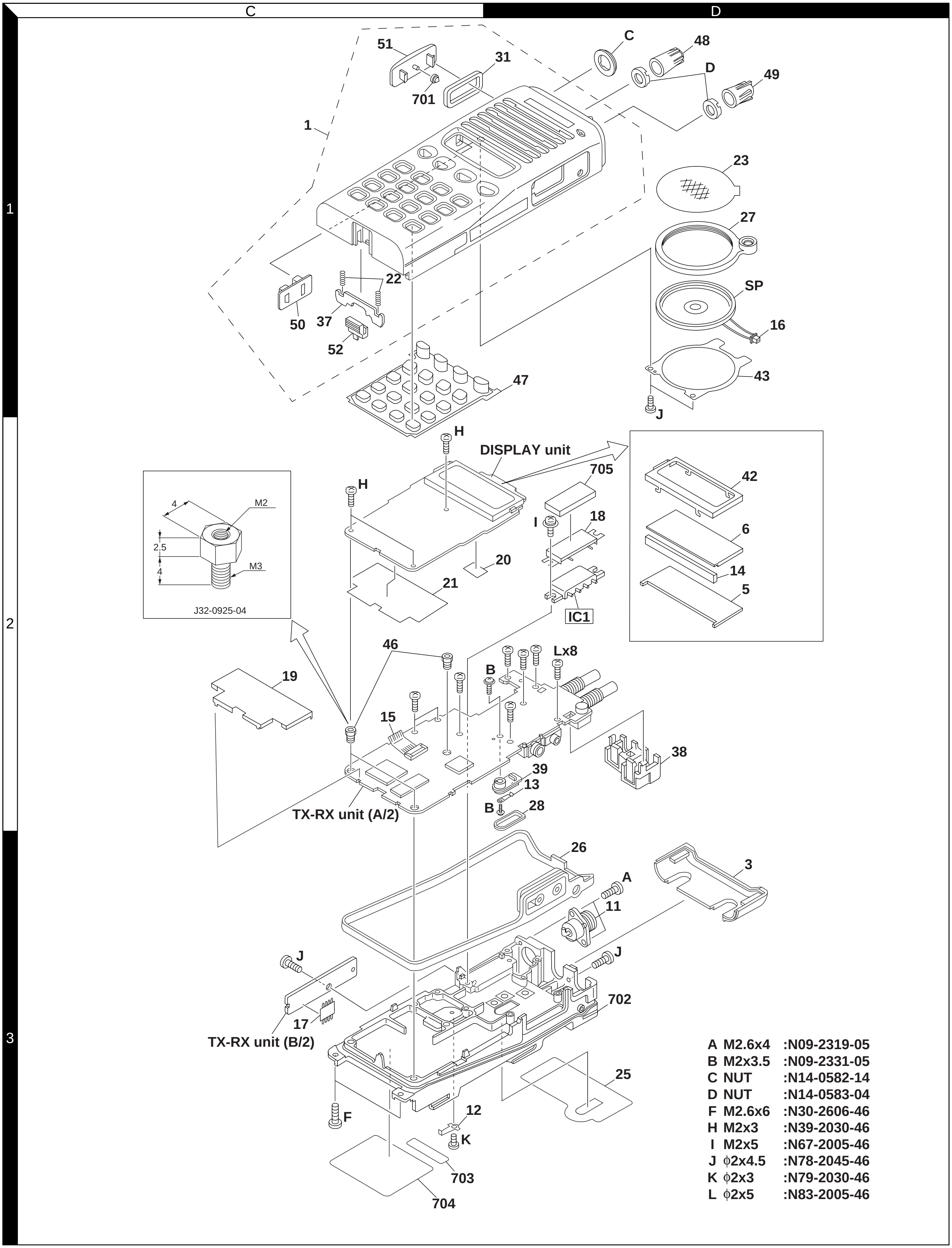
EXPLODED VIEW (TK-260G)



A	M2.6x4	:N09-2319-05
B	M2x3.5	:N09-2331-05
C	NUT	:N14-0582-14
D	NUT	:N14-0583-04
E	NUT	:N14-0588-04
F	M2.6x6	:N30-2606-46
G	M3x4	:N30-3004-46
J	ϕ2x4.5	:N78-2045-46
K	ϕ2x3	:N79-2030-46
L	ϕ2x5	:N83-2005-46

Parts with the exploded numbers larger than 700 are not supplied.

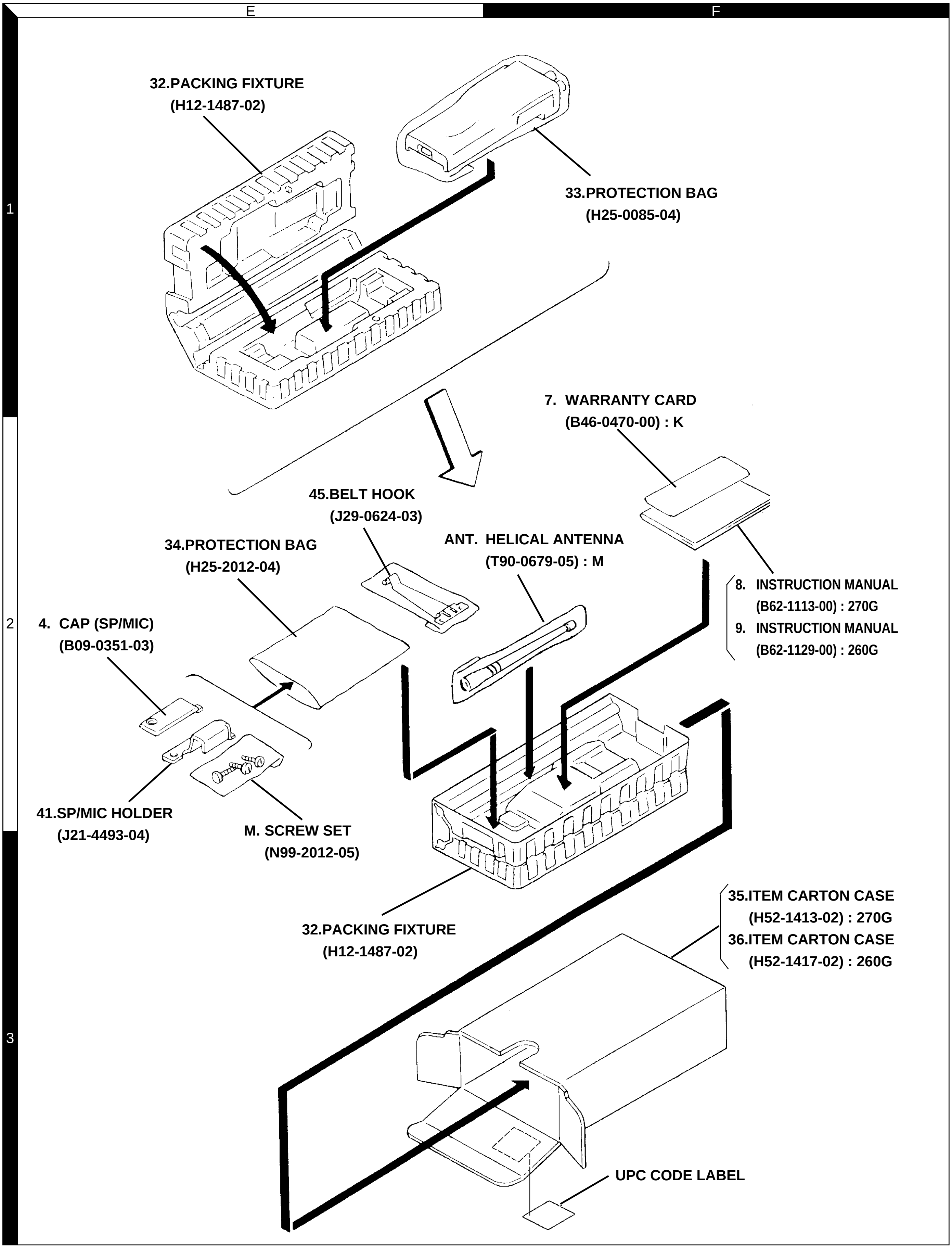
EXPLODED VIEW (TK-270G)



A	M2.6x4	:N09-2319-05
B	M2x3.5	:N09-2331-05
C	NUT	:N14-0582-14
D	NUT	:N14-0583-04
F	M2.6x6	:N30-2606-46
H	M2x3	:N39-2030-46
I	M2x5	:N67-2005-46
J	φ2x4.5	:N78-2045-46
K	φ2x3	:N79-2030-46
L	φ2x5	:N83-2005-46

Parts with the exploded numbers larger than 700 are not supplied.

PACKING


E
F
1
2
3
32.PACKING FIXTURE
(H12-1487-02)
33.PROTECTION BAG
(H25-0085-04)
7. WARRANTY CARD
(B46-0470-00) : K
45.BELT HOOK
(J29-0624-03)
34.PROTECTION BAG
(H25-2012-04)
ANT. HELICAL ANTENNA
(T90-0679-05) : M
8. INSTRUCTION MANUAL
(B62-1113-00) : 270G
9. INSTRUCTION MANUAL
(B62-1129-00) : 260G
4. CAP (SP/MIC)
(B09-0351-03)
41.SP/MIC HOLDER
(J21-4493-04)
M. SCREW SET
(N99-2012-05)
32.PACKING FIXTURE
(H12-1487-02)
35.ITEM CARTON CASE
(H52-1413-02) : 270G
36.ITEM CARTON CASE
(H52-1417-02) : 260G
UPC CODE LABEL

ADJUSTMENT

Test Equipment Required for Alignment

Test Equipment		Major Specifications	
1.	Standard Signal Generator (SSG)	Frequency Range Modulation Output	150 to 175MHz Frequency modulation and external modulation. -127dBm/0.1µV to greater than -47dBm/1mV
2.	Power Meter	Input Impedance Operation Frequency Measurement Range	50Ω. 150 to 175MHz or more. Vicinity of 10W
3.	Deviation Meter	Frequency Range	150 to 175MHz.
4.	Digital Volt Meter (DVM)	Measuring Range Input Impedance	10mV to 10V DC High input impedance for minimum circuit loading.
5.	Oscilloscope		DC through 30MHz.
6.	High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 1000MHz. 0.2ppm or less.
7.	Ammeter		5A.
8.	AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz. 1mV to 10V.
9.	Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more. 0 to 1V.
10.	Distortion Meter	Capability Input Level	3% or less at 1kHz. 50mV to 10Vrms.
11.	Spectrum Analyzer	Measuring Range	DC to 1GHz or more
12.	Tracking Generator	Center frequency Output Voltage	50kHz to 600MHz 100mV or more
13.	8Ω Dummy Load		Approx. 8Ω, 3W.
14.	Regulated Power Supply		5V to 10V, approx. 3A Useful if ammeter equipped.

■ The following parts are required for adjustment

1. Antenna connector adapter

The antenna connector of this radio uses an SMA terminal.

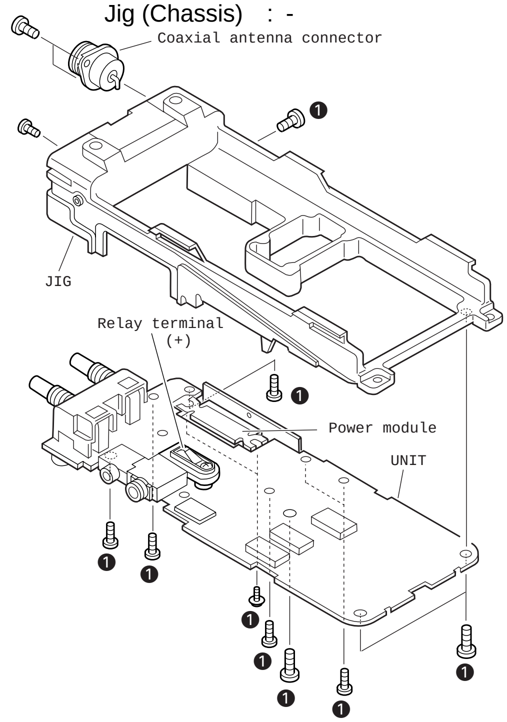
Use an antenna connector adapter [SMA(f) – BNC(f) or SMA(f) – N(f)] for adjustment. (The adapter is not provided as an option, so buy a commercially-available one.)

Note

When the antenna connector adapter touches the knob, draw out the knob to mount the connector.

Repair Jig (Chassis)

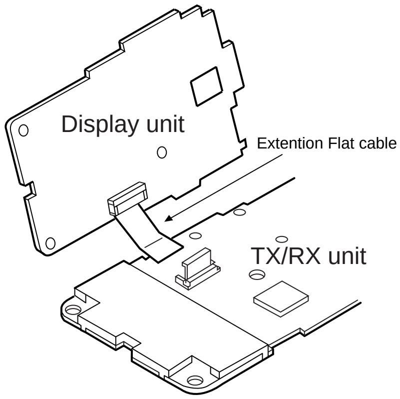
1. Jig (chassis : Part No. A10-4009-03) for adjustment.
2. Use the jig as follows.
   ① Place the TX-RX unit on the jig and fix it with thirteen screws ∂ .
   ② Solder the antenna terminal of the TX-RX unit.
3. Supply power from an external power supply.
   Relay terminal : + (7.5)
   Jig (Chassis) : -



ADJUSTMENT

Repair Jig (Extention Flat cable : part No. E37-0851-05)

This cable is used for connecting the TK-270G display unit and TX/RX unit when you test or repair the transceiver.



Caution : You must connect TK-270G display unit when you test or repair the transceiver.

Test Mode (TK-270G only)

■ Test mode operating features

This transceiver has a test mode. **To enter test mode, press the [◄] key and turn the power on. Hold the [◄] key until the test channel No. and test signalling No. appear on LCD.** Test mode can be inhibited by programming. To exit test mode, switch the power on again. The following functions are available in test mode.

- **Controls**

[PTT]	Used when making a transmission.
[MON]	Monitor ON and OFF.
[LAMP]	Changes wide and narrow.
[○]	Sets to the Tuning mode.
[●]	Unused
[◄]	RF power HIGH and LOW.
[►]	Changes signalling.
[O] to [9], and [#],[*] and [A] to [D]	Used as the DTMF keypad. If a key is pressed during transmission, the DTMF corresponding to the key that was pressed is sent.
[ENCODER]	Changes channel.

- **LCD indicator**

"LO" Lights at RF Power Low.

" 🔈 " Lights at moniter ON.

- **LED indicator**

Red LED Lights during transmission. Blinks during low battery voltage warning.

Green LED Lights when there is a carrier.

■ Frequency and signalling

The set has been adjusted for the frequencies shown in the following table. When required. re-adjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

Frequency (MHz)

Channel No.	K, M	
	RX Frequency	TX Frequency
1	162. 05000	162. 00000
2	150. 05000	150. 00000
3	173. 95000	174. 00000
4	162. 00000	162. 00000
5	162. 20000	162. 20000
6	162. 40000	162. 40000
7~16	——	——

Signalling

Signalling No.	RX	TX
1	None	None
2	None	100Hz square wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 210.7Hz	QT 210.7Hz
6	QT 250.3Hz	QT 250.3Hz
7	DQT D023N	DQT D023N
8	DQT D754I	DQT D754I
9	DTMF DEC, (159D)	DTMF ENC, (159D)
10	None	DTMF tone 9
11	2 tone 321.7/928.1Hz	None
12	Single tone 1200Hz	Single tone 1200Hz

- **Preparations for tuning the transceiver**

Before attempting to tune the transceiver, connect the unit to a suitable power supply.

Whenever the transmitter is tuned, the unit must be connected to a suitable dummy load (i.e. power meter).

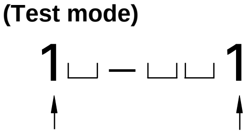
The speaker output connector must be terminated with a 8Ω dummy load and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement meter at all times during tuning.

- **Transceiver tuning**

(To place the transceiver in tuning mode)

Channel appears on the LCD. Set the channel according to the tuning requirements.

LCD display (Test mode)

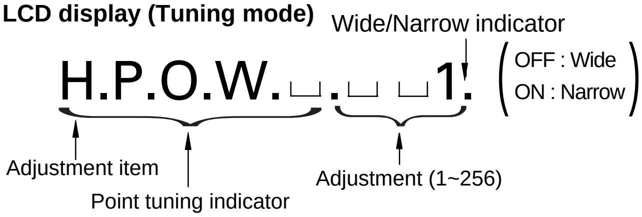


ADJUSTMENT

Press [○], to enter tuning mode. Use the [◄] key to write tuning data through the tuning modes, and the channel selector knob to adjust the tuning requirements (1 to 256 appears on LCD).

Use the [►] key to select the adjustment item through the tuning modes. Use the [●] key to adjust 3 or 5 point tuning, and use the [LAMP] key to switch between Wide/Narrow.

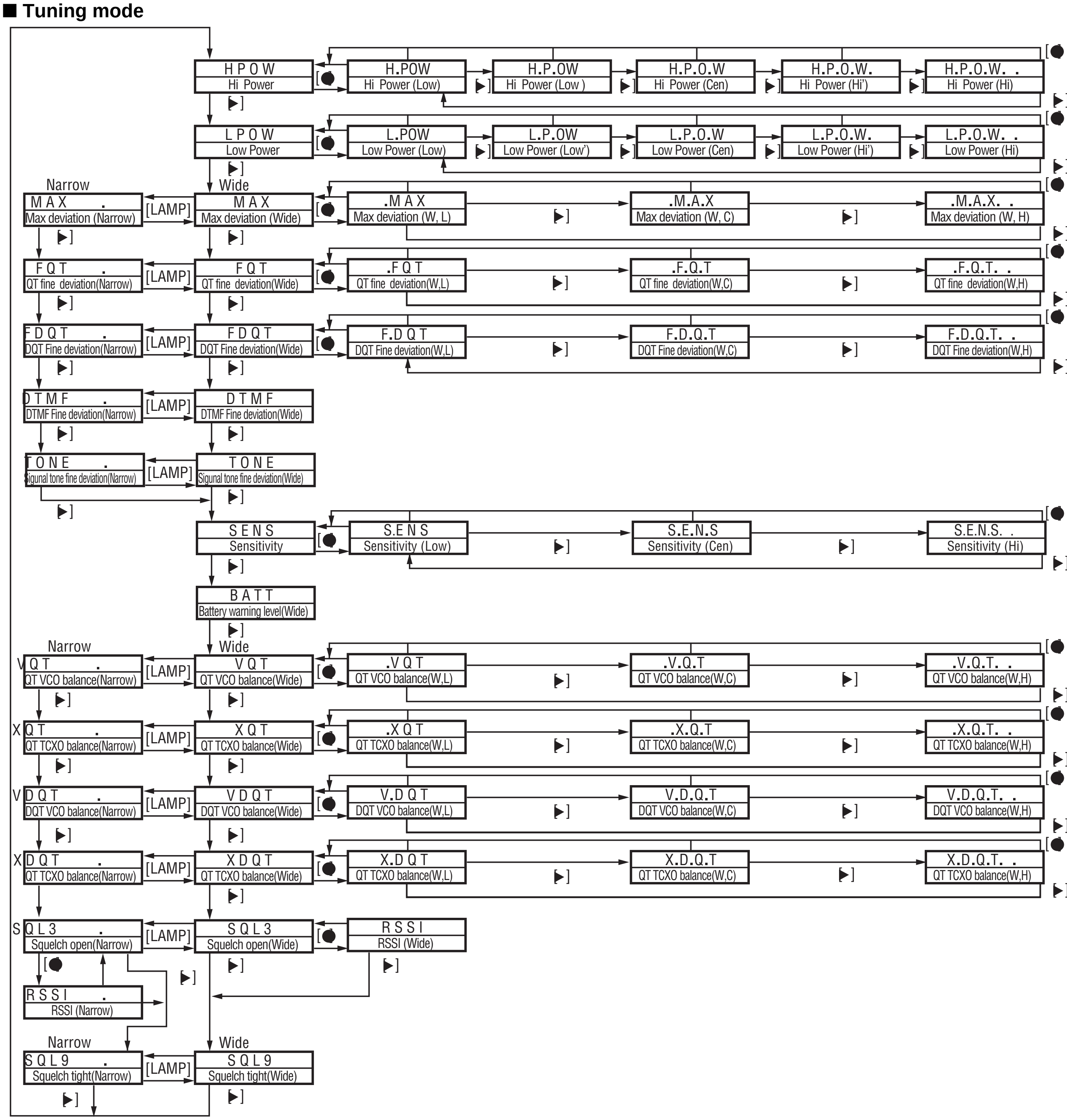
LCD display (Tuning mode)



Panel Tuning Mode

K,M	150-174(MHz)	
TEST Ch	RX frequency (MHz)	TX frequency (MHz)
L	150.05000	150.00000
L'	156.05000	156.00000
M	162.05000	162.00000
H'	168.05000	168.00000
H	173.95000	174.00000

■ Tuning mode



ADJUSTMENT

Since the TK-260G cannot be tuned from the panel, the FPU (KPG-56D) should be used for adjustment.
Adjust the receive BPF waveform according to the appropriate adjustment item.

Common Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Setting	1) BATT terminal voltage:7.5V 2) SSG Standard modulation [Wide] MOD:1kHz, DEV:3kHz [Narrow] MOD:1kHz, DEV:1.5kHz					
2. VCO lock voltage RX	[Panel Test Mode] 1) CH-Sig:2-1	Power meter	ANT		Check	0.8V or more
	2) CH-Sig:3-1	DVM	CV(LV)			4.0V ± 0.1V
TX	3) CH-Sig:2-1 PTT:ON					0.8V or more
	4) CH-Sig:3-1 PTT:ON					3.5V ± 0.1V

Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Frequency Adjust	1) PTT:ON	Freq. Counter Power meter Am meter	ANT	VR1	Center frequency (162.0 MHz) ± 50Hz	
2. Max Power Check	1) Adj item [HPOW] Adjust [256] 2) Adj item [H.P O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W] → [H.P.O.W. .] Adjust [256] PTT:ON				Check	5.2W or more
3. Hight Power Adjust	1) Adj item [HPOW] Adjust [***] 2) Adj item [H.P O W] → [H.P.O W] → [H.P.O.W] → [H.P.O.W] → [H.P.O.W. .] Adjust [***] PTT:ON			Encoder knob	5.0W	±0.1W 2.2A or less
4. Hight Power Check	[Panel Test Mode] 1) CH-Sig:1-1 PTT:ON				Check	4.0~6.0W 2.3A or less
	2) CH-Sig:2-1 PTT:ON					
	3) CH-Sig:3-1 PTT:ON					
5. Low Power Adjust	1) Adj item [LPOW] Adjust [***] 2) Adj item [L.P O W] → [L.P.O W] → [L.P.O.W] → [L.P.O.W.] → [L.P.O.W. .] Adjust [***] PTT:ON			Encoder knob	1.0W	±0.1W 1.0A or less
6. Low Power Check	[Panel Test Mode] 1) CH-Sig:1-1 Set low power (Push [◄]) PTT:ON				Check	0.5~1.5W 1.2A or less
	2) CH-Sig:2-1 PTT:ON					
	3) CH-Sig:3-1 PTT:ON					

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
7. Max DEV Adjust [Wide]	1) Adj item [MAX] Adjust [***] AG:1kHz / 150mV Dev meter filter LPF:15kHz HPF:OFF 2) Adj item [.M A X] → [.M.A.X] → [.M.A.X. .] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	ANT SP/MIC connector	Encoder knob	4.2kHz (According to the larger +,-)	±50Hz
[Narrow]	1) Adj item [MAX .] Adjust [***] PTT:ON				2.1kHz (According to the larger+,-)	
8. MIC Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig:1-1 AG:1kHz / 15mV LPF:15kHz PTT:ON				Check	2.2~3.0kHz
9. DQT VCO Balance Adjust [Wide]	1) Adj item [VDQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [V.D Q T] → [V.D.Q.T] → [V.D.Q.T. .] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope AG AF VTVM	ANT SP/MIC connector	Encoder knob	Make the demodulation waves into square waves.	
[Narrow]	3) Adj item [VDQT .] Adjust [***] PTT:ON					
10.QT TCXO Balance	Adj item [X Q T] Adjust [200] Wide, Narrow					
11.DQT TCXO Balance	Adj item [X D Q T] 5 Adjust [150] Wide, Narrow					
12.QT VCO Balance	Adj item [V Q T] Adjust [***] $[VDQT] \times \frac{200}{150} = [VQT]$					
13. QT Deviation Adjust [Wide]	1) Adj item [FQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [.F Q T] → [.F.Q. T] → [.F.Q.T. .] Adjust [***] PTT:ON				Wide:0.90kHz Narrow:0.42kHz	±40Hz ±40Hz
[Narrow]	3) Adj item [FQT.] Adjust [***] PTT:ON					

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
14.DQT Devition Adjust [Wide]	1) Adj item [FDQT] Adjust [***] LPF:3kHz HPF:OFF 2) Adj item [F.D Q T] → [F.D.Q.T] → [F.D.Q.T. .] Adjust [***] PTT:ON	Power meter Dev meter Oscilloscope	ANT SP/MIC connector	Encoder knob	Wide:0.75kHz MAX Narrow:0.4kHz MAX	
[Narrow]	3) Adj item [FDQT.] Adjust [***] PTT:ON					
15.DTMF Deviation Adjust [Wide]	1) Adj item [DTMF] Adjust [***] LPF:15kHz HPF:OFF PTT:ON				Wide:2.5kHz Narrow:1.25kHz	±0.1kHz
[Narrow]	2) Adj item [DTMF .] Adjust [***] PTT:ON					
16.TONE Deviation Adjust [Wide]	1) Adj item [TONE] Adjust [***] LPF:15kHz HPF:OFF PTT:ON				Wide:3.0kHz Narrow:1.5kHz	±0.1kHz
[Narrow]	2) Adj item [TONE .] Adjust [***] PTT:ON					
17.BATT Detection Writing	1) Adj item [BATT] Adjust [***] PTT:ON	Power meter DVM	ANT BATT terminal	Encoder knob	After pressing the PTT switch, confirm that one predetermined numeric in the range of 1 to 256 appears, then press the [◀] key. That number will be stored in memory.	BATT terminal voltage:5.9V
18.BATT Detection Check	**[Panel Test Mode]** 1) CH-Sig:1-1 BATT terminal voltage:6.5V PTT:ON				Check	No blinking of LED
	2) BATT terminal voltage:5.7V PTT:ON					Blinking of LED

ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remark
		Test equipment	Terminal	Parts	Method	
1. Sensitivity Adjustment PTT : ON	Adj item [SENS] Adjust [∗∗∗] f_L f_C f_H [S.E N S] → [S.E.N.S] → [S.E.N.S. .]	DVM		Encoder knob	f_L : ([S.E N S]) : [88] f_C : (S.E.N.S) : [134] f_H : (S.E.N.S. .) : [180]	
2. BPF	(PANEL TEST MODE) CH-Sig 2-1 Tra-G setting -40dBm	Tracking generator spectrum analyzer	ANT BPF	L305, L306, L307	Adjust wave form to figure 1.(f_L)	
	CH-Sig 1-1				Check wave form to figure 2.(f_C)	
	CH-Sig 3-1				Check wave form to figure 1.(f_H)	

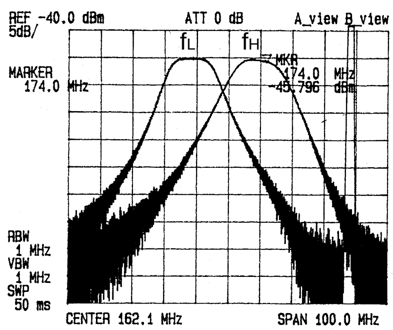


Fig. 1

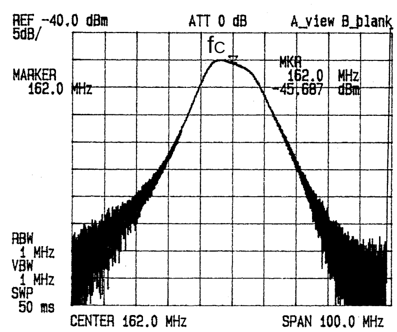


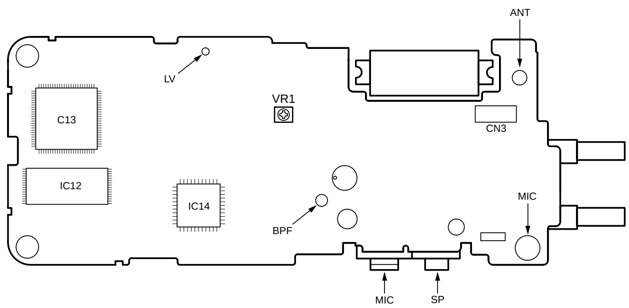
Fig. 2

BPF-WAVE

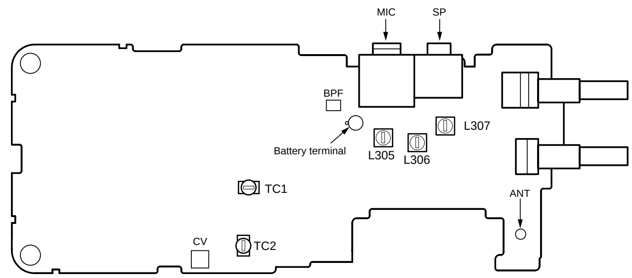
Item	Condition	Test equipment	Terminal	Parts	Method	Specifications/ Remark
3. Sensitivity Check	**[Panel Test Mode]** 1) CH-Sig:1-1 SSG OUT Wide:-117dBm (0.3µV) (MOD:1kHz / ±3kHz) Narrow:-117dBm (0.3µV) (MOD:1kHz / ±1.5kHz)	SSG AF VTVM Oscilloscope	ANT		Check	12dB SINAD or more
4. Squelch (open) Adjust (Wide) (Narrow)	1) Adj item [SQL3] Adjust [∗∗∗] SSG OUT: -124dBm (0.14µV) 2) Adj item [SQL3.] Adjust [∗∗∗] -124dBm (0.14µV)				Encoder knob squelch.	Adjust to the squelch threshold point
5. Squelch(Tight) Adjust [Wide]	1) Adj item [SQL9] Adjust [∗∗∗] SSG OUT:-117dBm (0.3µV)					Adjust to the squelch threshold point
[Narrow]	1) Adj item [SQL9.] SSG OUT:-117dBm (0.3µV)					
6. Squelch Check	**[Panel Test Mode]** 1) CH-Sig:1-1 SQ Level:[SQL5] SSG OUT: -118dBm (0.28µV) 2) SSG OUT:OFF				Check	Squelch must be opened. Squelch must be closed.

ADJUSTMENT

Adjustment points TX-RX unit (X57-587)
Component side view



Foil Side View



VR1 : Frequency adjustment

TC1 : Transmit lock voltage adjustment
TC2 : Receive lock voltage adjustment
L305:
L306: } Band-pass filter waveform adjustment
L307:
BPF : Band-pass filter test point
CV(LV) : Lock voltage adjustment terminal.

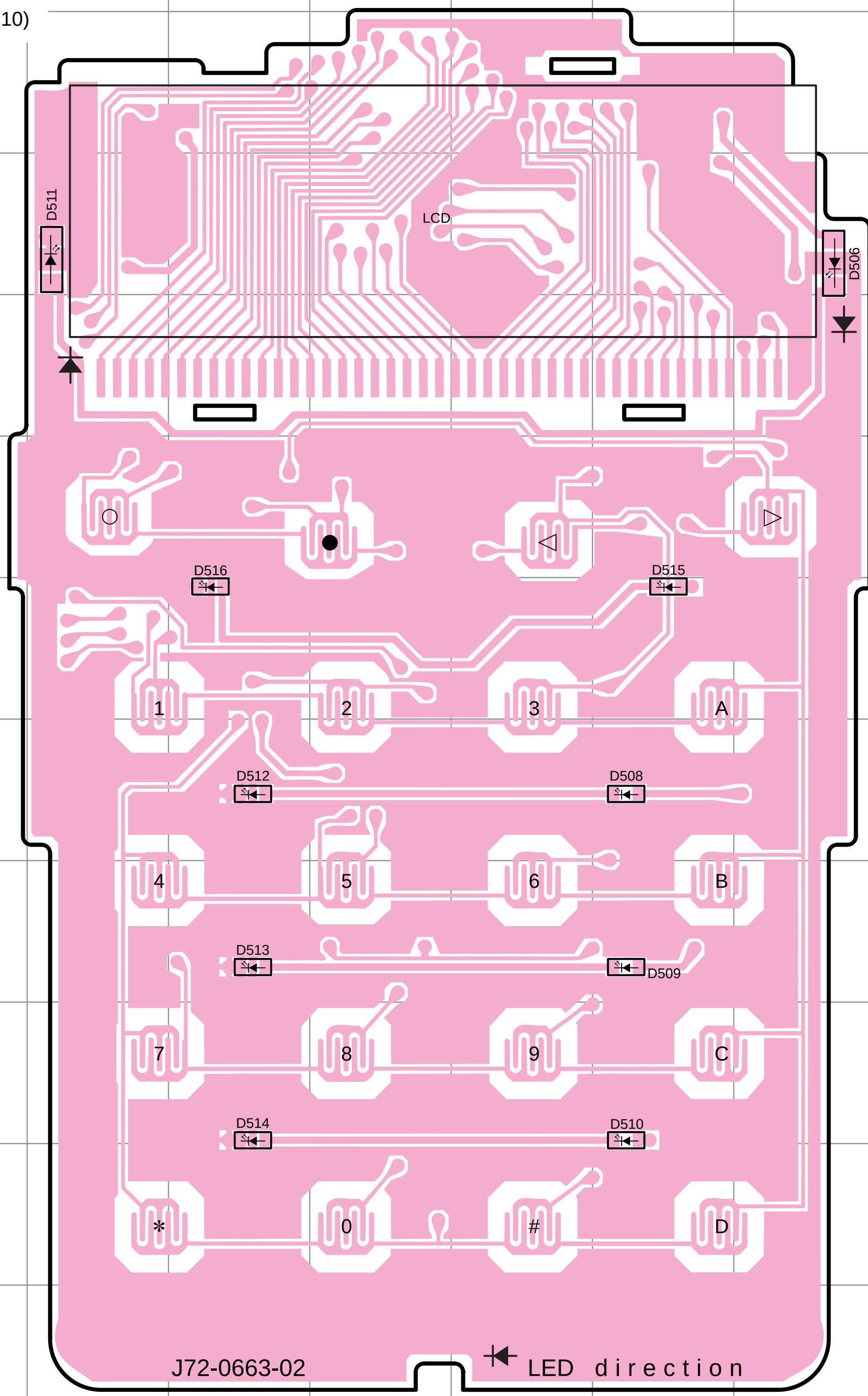
Fig. 2 Adjustment points

PC BOARD VIEW TK-260G/270G

DISPLAY UNIT (X54-3250-10) Component Side View

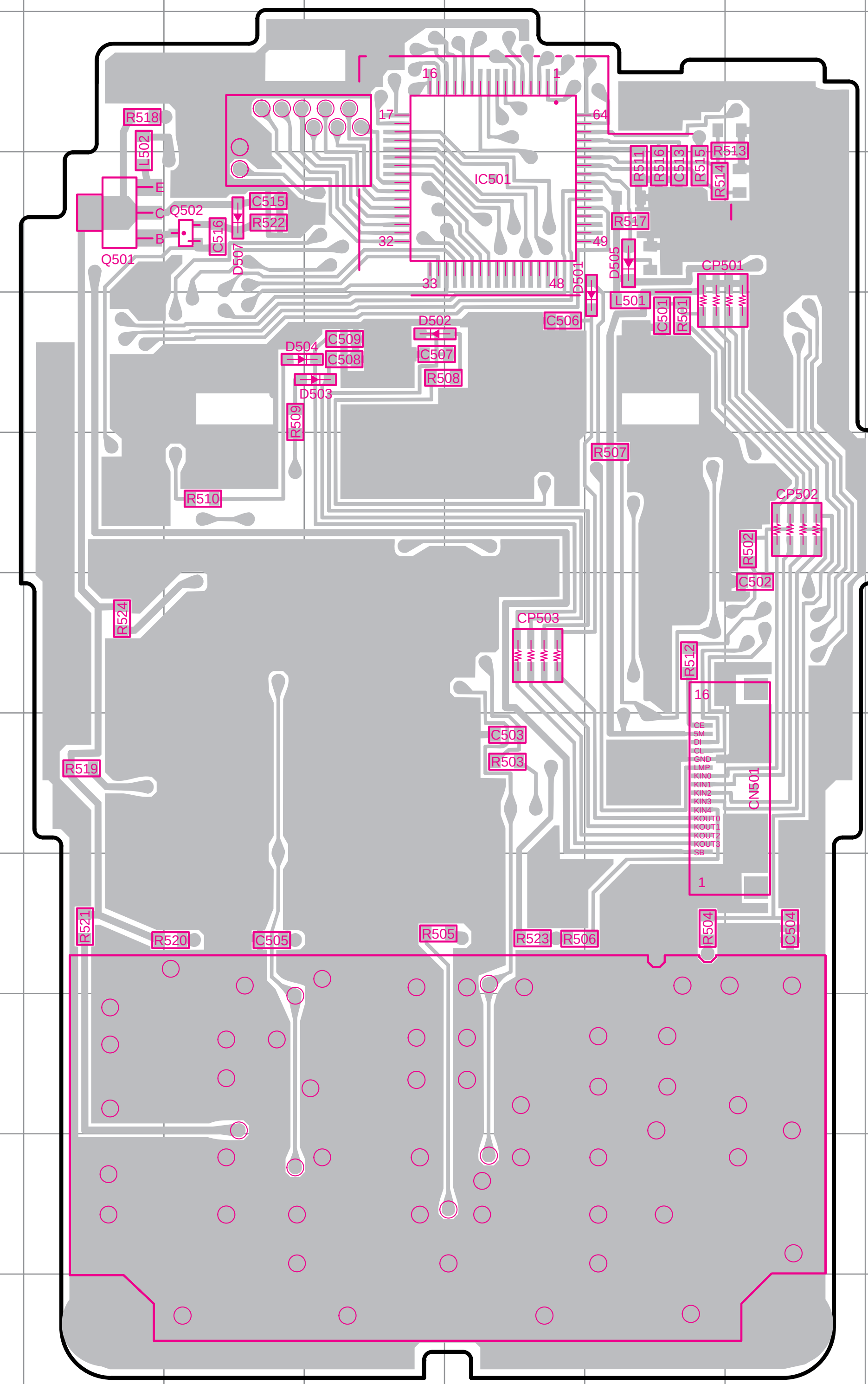
DISPLAY UNIT (X54-3250-10)
Component Side View

Ref. NO.	Address
IC501	4E
Q501	4H
Q502	4G
D501	4D
D502	5F
D503	5F
D504	5F
D505	4D
D506	4H
D507	4G
D508	8G
D509	9G
D510	10G
D511	4C
D512	8D
D513	9D
D514	10D
D515	7G
D516	7D



Component Side
Foil Side

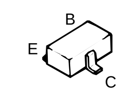
DISPLAY UNIT (X54-3250-10) Foil Side View



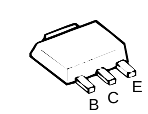
DISPLAY UNIT (X54-3250-10)
Foil Side View

Ref. NO.	Address
IC501	4N
Q501	4K
Q502	4L
D501	4O
D502	5M
D503	5M
D504	5M
D505	4O
D506	4K
D507	4L
D508	8L
D509	9L
D510	10L
D511	4P
D512	8O
D513	9O
D514	10O
D515	7L
D516	7O

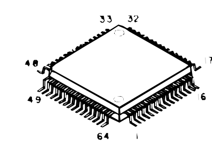
2SC4617(S)



2SB1132(Q,R)



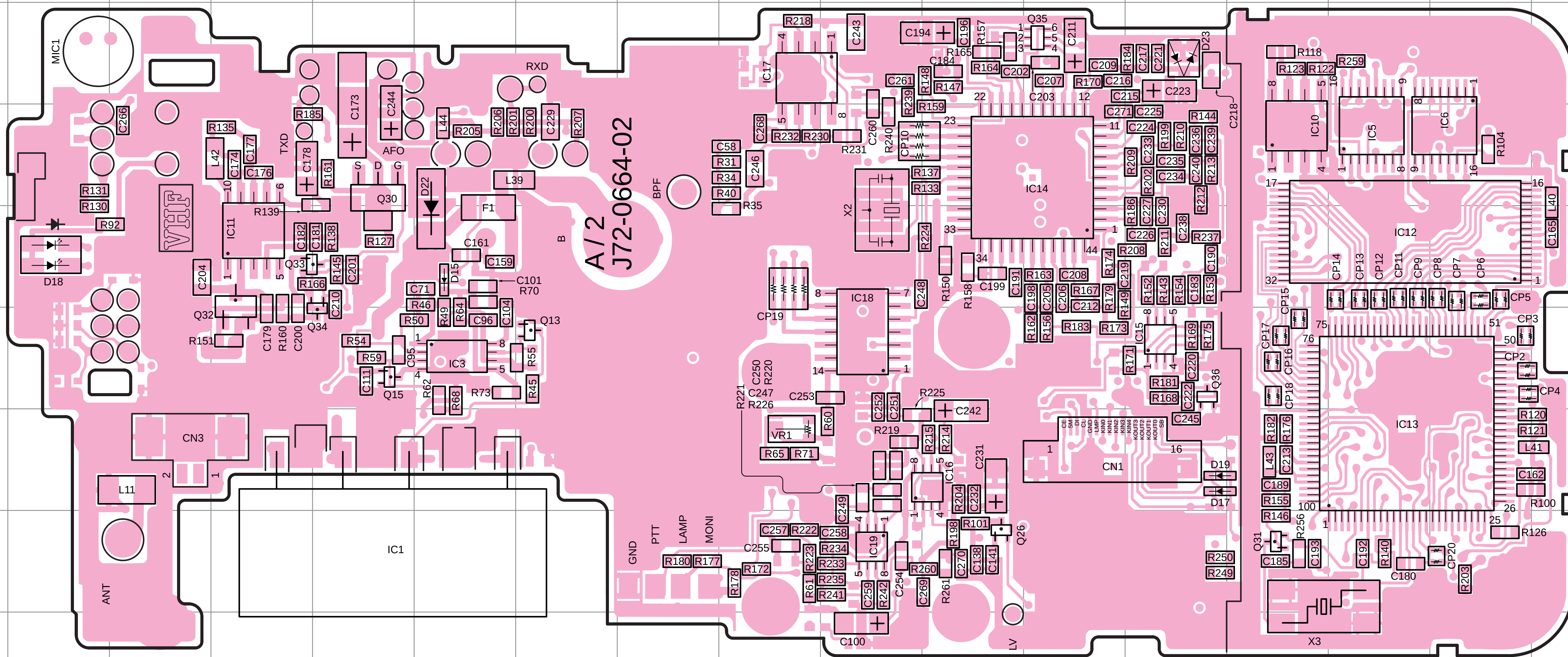
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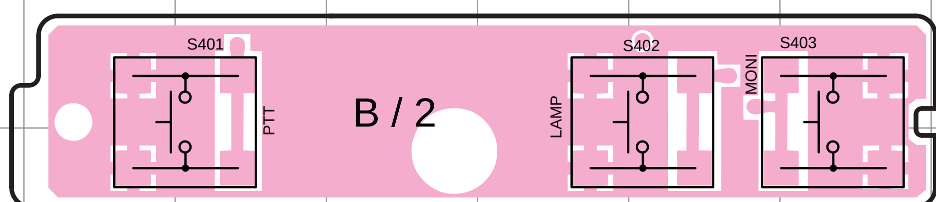


Component Side
Foil Side

TK-260G/270G PC BOARD VIEW

TX RX UNIT (X57-5870-XX) Component Side View
0-10:TK260G K,M, 0-11:TK-270G K, 0-21:TK-270G M

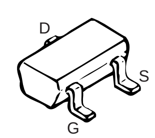




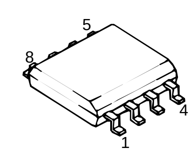
TX-RX UNIT (X57-5870-XX)
Component Side View

Ref. NO.	Address
IC1	8E
IC3	6F
IC5	4O
IC6	4P
IC10	4N
IC11	5D
IC12	5O
IC13	7O
IC14	4L
IC15	6M
IC16	7K
IC17	3I
IC18	6J
IC19	8J
Q13	6G
Q15	6E
Q26	8K
Q30	4E
Q31	8N
Q32	5D
Q33	5D
Q34	5E
Q35	3L
Q36	6M
D15	5F
D17	7M
D19	7M
D22	4F
D23	3M

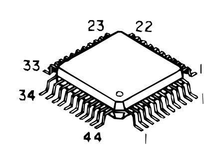
2SK1824



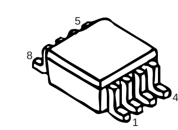
X9C103SI



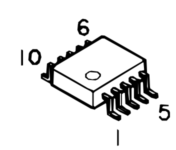
TC35453F



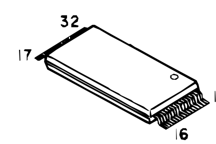
TA73W01FU
TC75W51FU



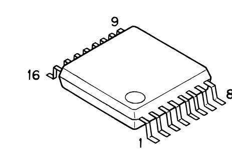
TA7368F



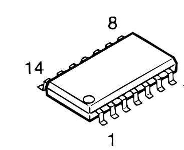
AT29C020-90TI



BU4094BCFV

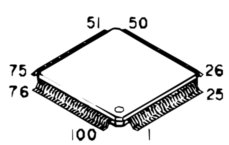


LC73872M

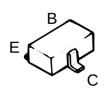


	Component side
Pattern 1	
Pattern 2	
Pattern 3	
Pattern 4	
	Foil side

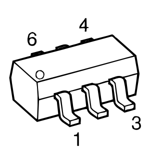
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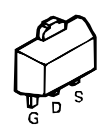
2SA1362(GR)
2SC4619



UPA672T

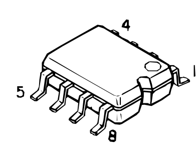


2SK1588

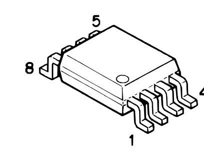


DTA114EE
DTA144EE
DTC114EE

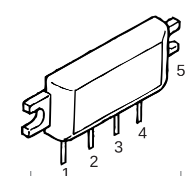
AT2408SN10SI2.5



NJM2904V



M68732H



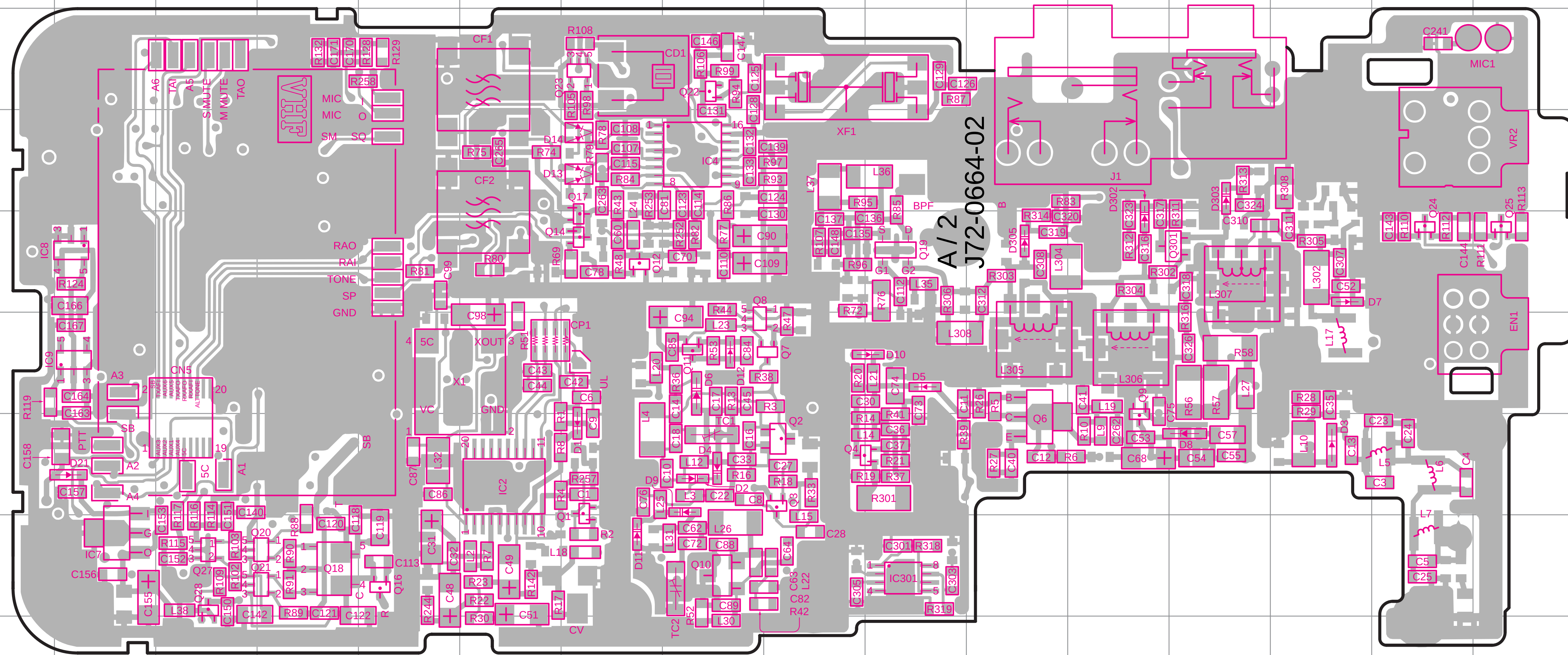
A B C D E F G H I J K L M N O P Q R S

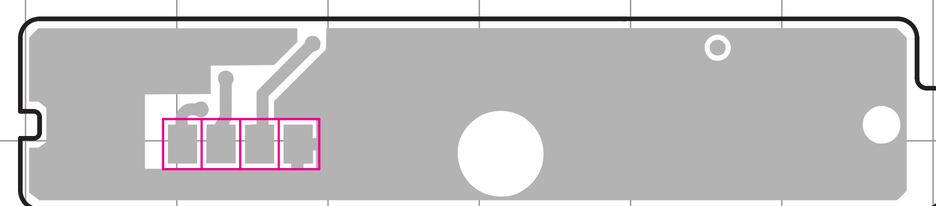
PC BOARD VIEW TK-260G/270G

TX RX UNIT (X57-5870-XX) Foil Side View
0-10:TK260G K,M, 0-11:TK-270G K, 0-21:TK-270G M

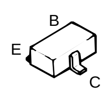
TX-RX UNIT (X57-5870-XX)
Foil Side View

Ref. NO.	Address
IC2	7H
IC4	4J
IC7	8D
IC8	5D
IC9	6D
IC301	8L
Q1	8I
Q2	7K
Q3	7K
Q4	7L
Q6	7M
Q7	6K
Q8	6J
Q9	6N
Q10	8J
Q11	6J
Q12	5I
Q14	5I
Q16	8G
Q17	5I
Q18	8F
Q19	5L
Q20	8F
Q21	8F
Q22	3J
Q23	3I
Q24	5Q
Q25	5R
Q27	8E
Q28	8E
Q301	5O
D1	7I
D2	7J
D3	7P
D4	7J
D5	6L
D6	6J
D7	5P
D8	7O
D9	7J
D10	6L
D11	8I
D12	6J
D13	4I
D14	4I
D21	7D
D302	5N
D303	4O
D305	5M

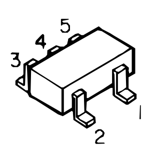




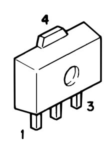
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DTA114YE
DTA144EE
DTC114EE
DTC144EE
2SC4226(R24)
2SC4617(S)
2SC5108(Y)
2SC4649(N,P)



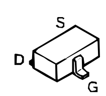
UMC4



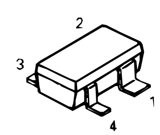
2SC4988



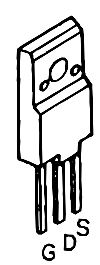
2SK508NV(K52)



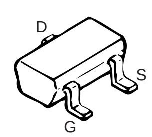
3SK228



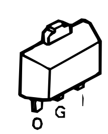
UPA572T



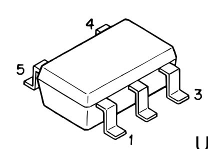
2SJ243



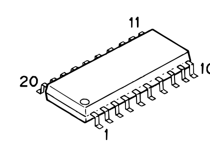
S-81350HG-KD



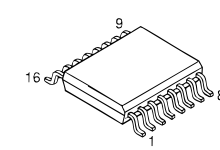
PST9140NR
RN5VL45C



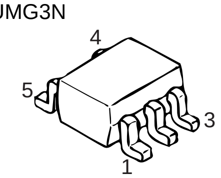
MB15A02



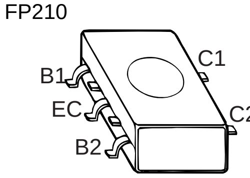
TA31136FN



UMG3N



FP210



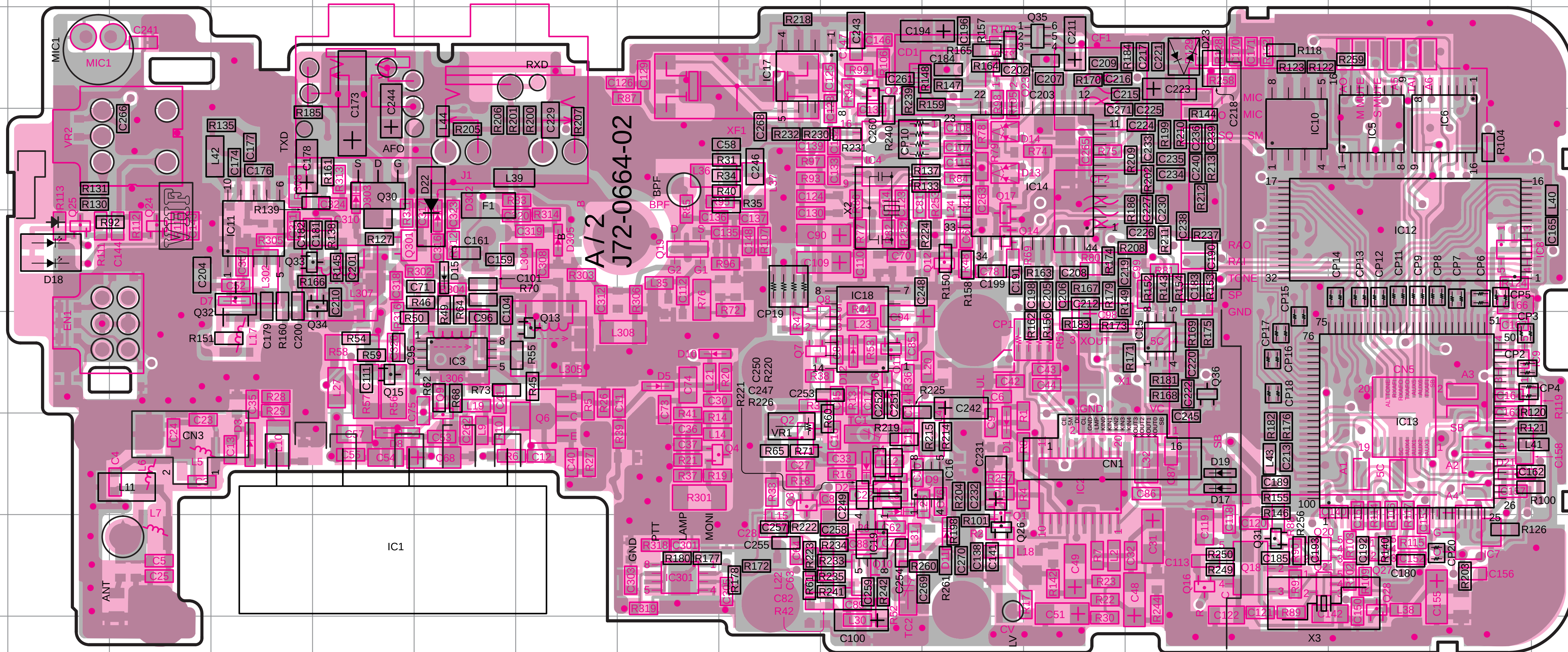
Component side

Pattern 1	
Pattern 2	
Pattern 3	
Pattern 4	

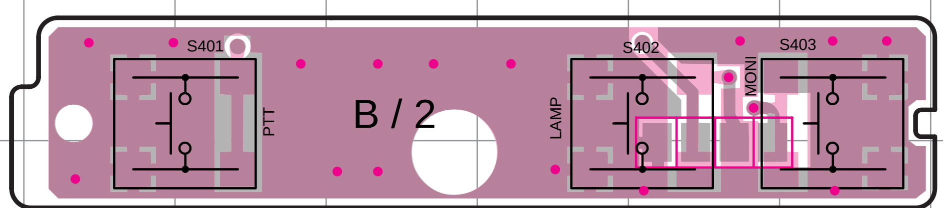
Foil side

TK-260G/270G PC BOARD VIEW

TX RX UNIT (X57-5870-XX) Component Side + Foil Side View
0-10:TK260G K,M, 0-11:TK-270G K, 0-21:TK-270G M



Component side
Pattern 1
Pattern 2
Pattern 3
Pattern 4
Foil side



TX-RX UNIT (X57-5870-XX)
Component Side + Foil Side View

Ref. NO.	Address
IC1	8E
IC2	7L
IC3	6F
IC4	4J
IC5	4O
IC6	4P
IC7	8P
IC8	5P
IC9	6P
IC10	4N
IC11	5D
IC12	5O
IC13	7O
IC14	4L
IC15	6M
IC16	7K
IC17	3I
IC18	6J
IC19	8J
IC301	8H
Q1	8K
Q2	7I
Q3	7I
Q4	7H
Q6	7G
Q7	6I
Q8	6J
Q9	6F
Q10	8J
Q11	6J
Q12	5K
Q13	6G
Q14	5K
Q15	6E
Q16	8M
Q17	5K
Q18	8N
Q19	5H
Q20	8N
Q21	8N
Q22	3J
Q23	3K

Ref. NO.	Address
Q24	5C
Q25	5B
Q26	8K
Q27	8O
Q28	8O
Q30	4E
Q31	8N
Q32	5D
Q33	5D
Q34	5E
Q35	3L
Q36	6M
Q301	5O
D1	7K
D2	7J
D3	7O
D4	7J
D5	6H
D6	6J
D7	5D
D8	7E
D9	7J
D10	6H
D11	8K
D12	6J
D13	4K
D14	4K
D15	5F
D17	7M
D19	7M
D22	4F
D23	3M
D302	5F
D303	4E
D305	5G

TA73W01FU
TC75W51FU


2SK1588
UPA672T
S-81350HG-KD
AT2408SN10SI2.5
MB15A02
TA31136FN

DTA114EE
DTA114YE
DTA144EE
DTC114EE
DTC144EE
2SA1362(GR)
2SC4226(R24)
2SC4617(S)
2SC4619
2SC5108(Y)
2SC4649(N,P)

30622M4102GP
FP210
UMC4
2SK508NV(K52)
3SK228
M68732H
2SC4988


UPA572T
2SJ243
2SK1824
TA7368F
X9C103SI
AT29C020-90TI
TC35453F
PST9140NR
RN5VL45C
BU4094BCFV
NJM2904V
LC73872M
UMG3N

SCHEMATIC DIAGRAM TK-260G



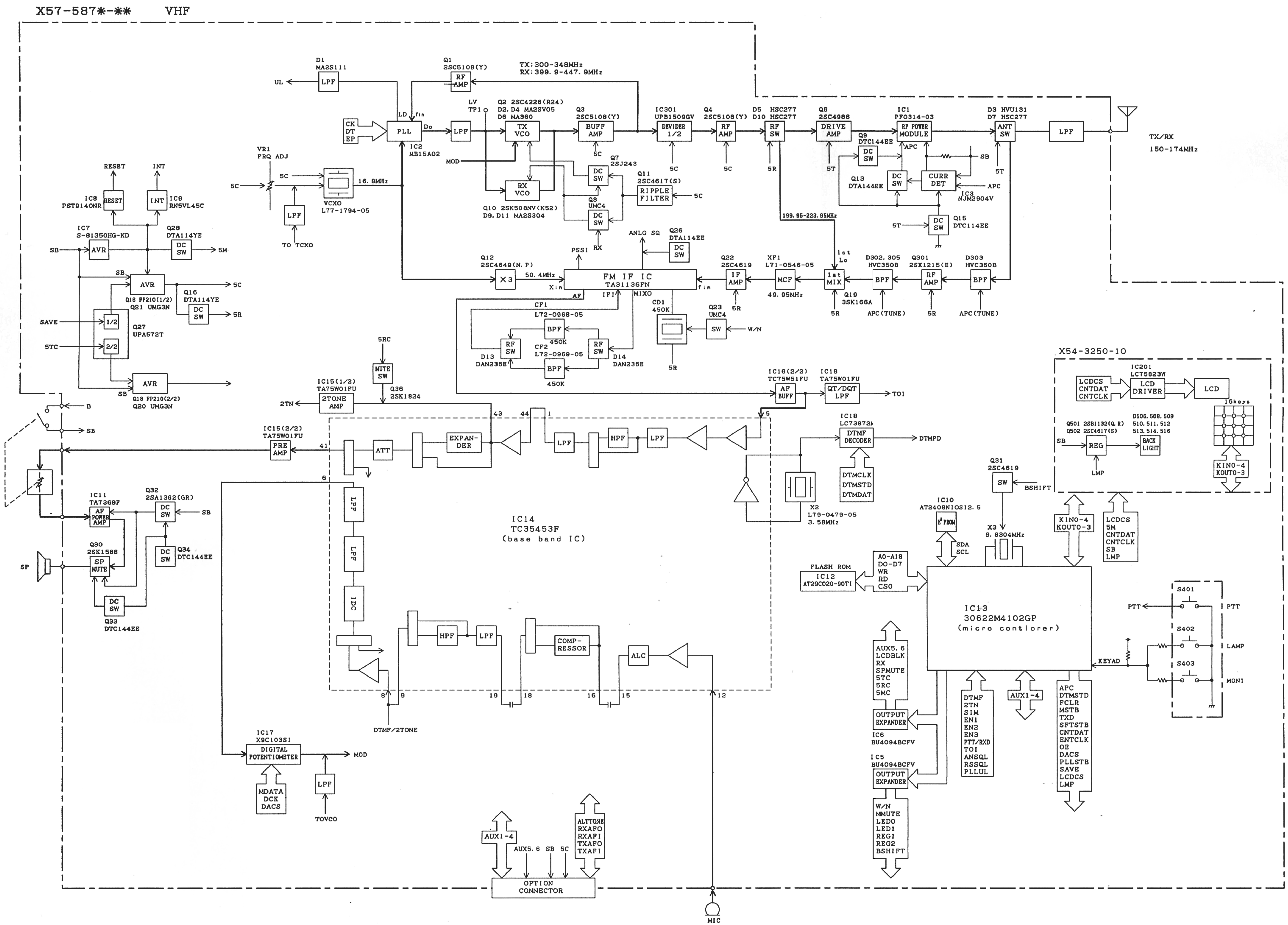
Note) Component marked with a dot (●) are Parts of pattern 1.

TK-270G SCHEMATIC DIAGRAM



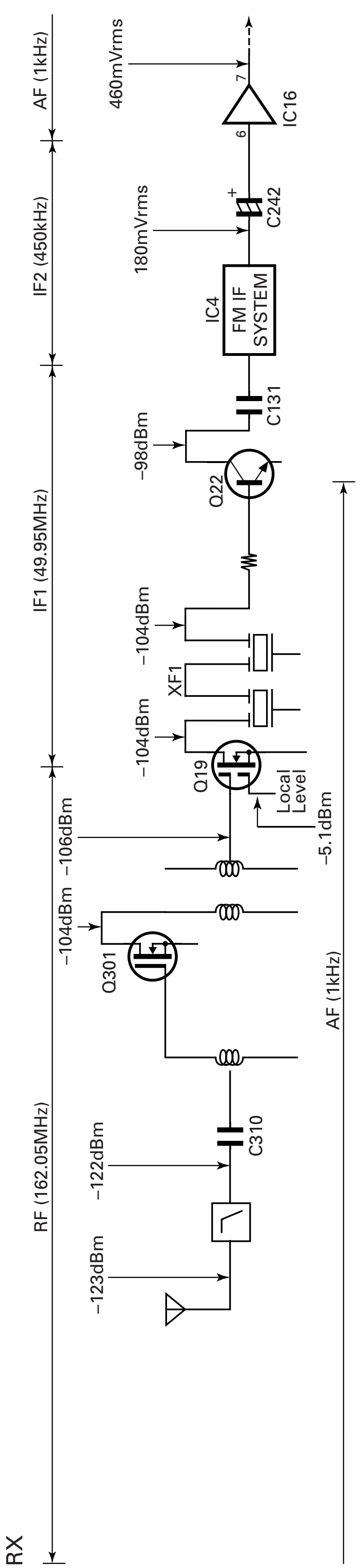
Note) Component marked with a dot (●) are Parts of pattern 1.

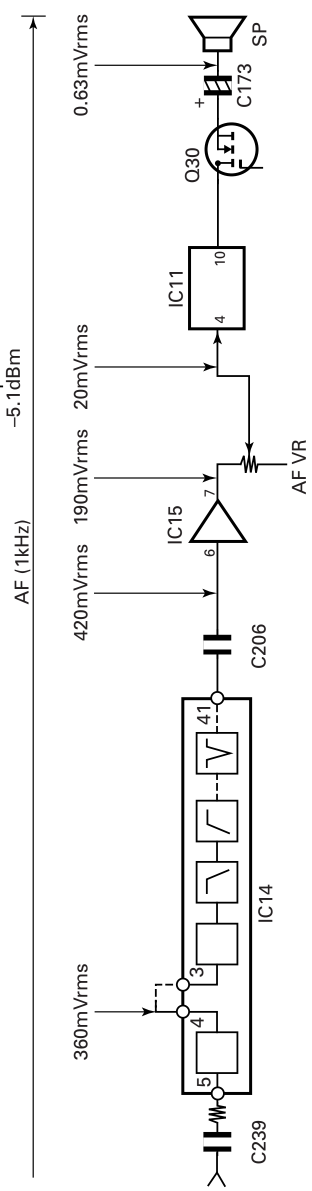
BLOCK DIAGRAM



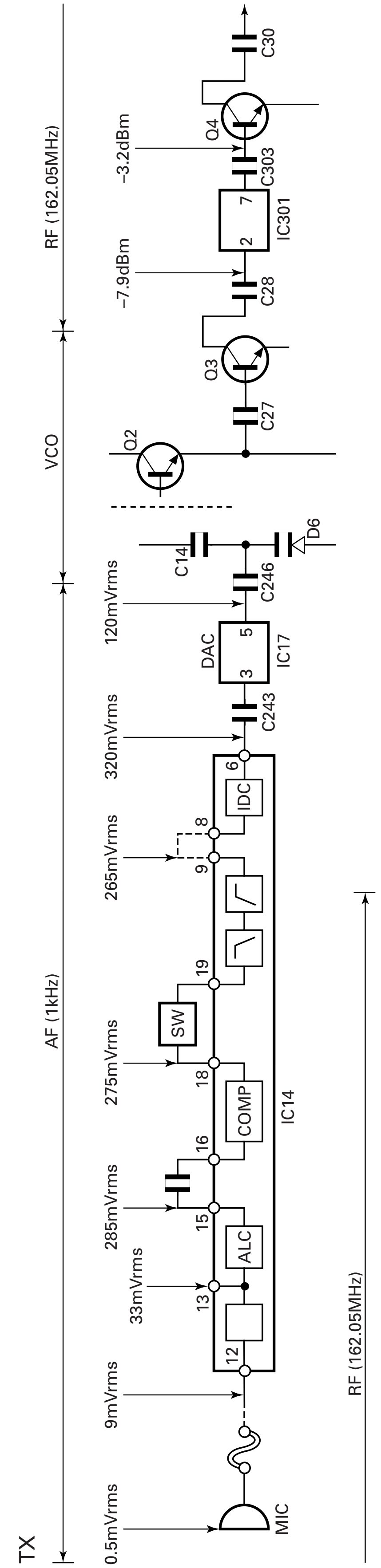
TK-260G/270G

LEVEL DIAGRAM

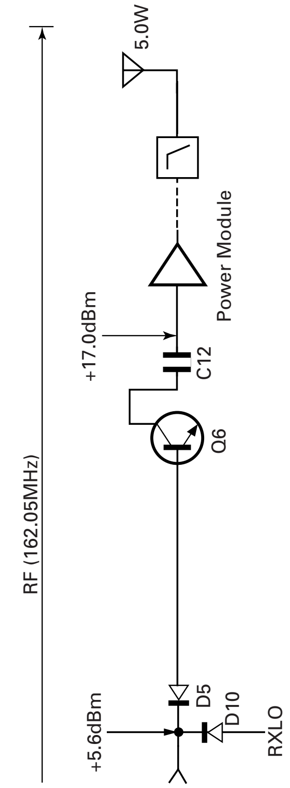




To make measurements in the AF section, connect the AC level meter. (ANT input : -53dBm, 1kHz FM, 3kHz DEV(WIDE).)
In the RF section, use a 1000pF coupling capacitor. (The display shows the SSG input value required to obtain 12dB SINAD Without Local Level.)



AG is set to the MIC input becomes 3kHz DEV. at 1kHz MOD. (WIDE)
To make measurements in the AF section, connect the AC level meter.
In the RF section, use a 1000pF coupling capacitor.

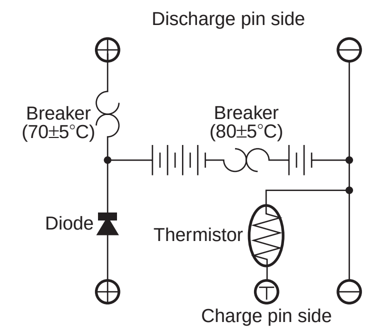


KNB-14/KNB-15A (Ni-Cd BATTERY)

KNB-14



CIRCUIT DIAGRAM



SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Charging current	: 600mAh
Dimensions	: 60.8W x 110.8H x 17.3D (mm) (projections included)

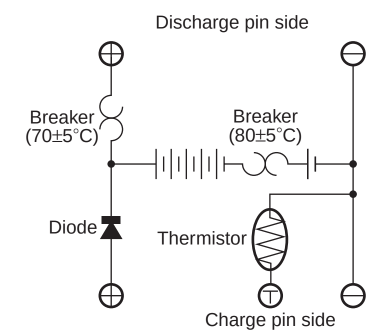
Charger and charging time:
KSC-15 (normal charger), approximately 8 hours
KSC-16 (rapid charger), approximately 1 hour

Weight	: 165g

KNB-15A



CIRCUIT DIAGRAM



SPECIFICATIONS

Voltage	: 7.2V (1.2V x 6)
Charging current	: 1100mAh
Dimensions	: 60.8W x 110.8H x 20.3D (mm) (projections included)

Charger and charging time:
KSC-15 (normal charger), approximately 8 hours
KSC-16 (rapid charger), approximately 2 hours

Weight	: 210g

OPTIONS

KMC-17 (Speaker microphone)



KMC-17 Parts List

Ref. No.	New parts	Parts No.	Description	Re-marks
		A02-0907-08	Case (Front)	
		A02-0908-08	Case (Rear)	
		B09-0316-08	Cap	
		D10-0606-08	Lever (PTT)	
		E11-0421-05	Phone jack	
		E30-3138-08	Curl cord	
		F07-0889-08	Silicon rubber (PTT)	
		G53-0569-08	Packing (MIC case)	
		J29-0440-08	Clip assy	
		J39-0601-08	Packing (MIC)	
		N46-2605-60	Screw (Clip assy)	
		N46-3016-60	Screw (Case)	
		N80-2005-41	Screw (MIC unit)	
		S50-1415-05	Tact switch (PTT)	
		T07-0290-05	Loudspeaker (1W, 8Ω)	
		T91-0534-08	Condenser MIC	

KMC-21 (Speaker microphone)



KMC-21 Parts List

Ref. No.	New parts	Parts No.	Description	Re-marks
		A02-1979-08	Case (Front)	
		A02-0980-08	Case (Rear)	
		E11-0453-08	Phone jack	
		E30-3239-08	Curl cord	
		F07-1414-08	Cover	
		K29-5077-08	Lever (PTT)	
		S70-0444-08	Tact switch (PTT)	
		T07-0335-05	Loudspeaker	
		T91-0564-08	Condenser MIC	

SPECIFICATION

General

Frequency Range	150~174MHz
Number of channels	Max. 8 (TK-260G) Max. 128 (TK-270G)
Number of groups	Max. 128 (TK-270G)
Channel Spacing	25kHz, 30kHz (Wide) 12.5kHz, 15kHz (Narrow)
PLL Step	2.5kHz, 5kHz, 6.25kHz, 7.5kHz
Operating Voltage	7.5 VDC
Battery Life	More than 8 hours at 5 watts (5-5-90 duty cycle with KNB-15A battery)
Operating Temperature renge	-30˚C to +60˚C (-22 ˚F to +140 ˚F)
Dimensions and Weight	
With KNB-14 (7.2V 600mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 32 (1-1/4) D mm (in) 400g (0.88lbs)
With KNB-15A (7.2V 1100mAh battery)	58 (2-5/16) W x 135 (5-5/16) H x 35 (1-3/8) D mm (in) 440g (0.97lbs)

Receiver (Measurements made per EIA standard EIA-RS316B)

Sensitivity	
EIA 12dB SINAD	0.25µV (Wide)/0.28µV (Narrow)
Selectivity	70dB (Wide)/65dB (Narrow)
Intermodulation	65dB (Wide)/60dB (Narrow)
Spurious responce	65dB
Audio Power Output	500mW
Frequency Stability	±3ppm
Channel Frequency Spread	24MHz

Transmitter (Measurements made per EIA standard EIA-RS 316B)

RF Power output	5W/1W
Spurious and Harmonics	70dB
Modulation	16KϕF3E (Wide)/11KϕF3E (Narrow)
FM Noise	-45dB (Wide)/-43dB (Narrow)
Audio Distortion	Less than 5%
Frequency Stability	±3ppm
Channel Frequency Spread	24MHz

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